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The IRON AGE

SEPTEMBER 30, 1948

# You wouldn't use a bent pin for bass

UNLESS you have the right equipment you can't expect results . . . either at play or at work. For handling heavy materials and work-in-process you need a Whiting Electric Traveling Crane.

Whiting Cranes are engineered especially for the job at hand—in capacity, construction, hoisting, and traveling speeds. Such equipment brings materials-handling costs to the lowest possible level, and reduces the out-of-service and maintenance time which so often interferes with production schedules.

A Whiting representative will gladly discuss modern materials-handling methods with you, and submit a proposal for bringing your present system up to date.

**IMPORTANT**

*Whiting has acquired the patents, manufacturing, and sales rights to Spencer & Morris Tramrail Systems. These, combined with Whiting Hoists, Light Cranes, and Heavy Cranes, enable Whiting to supply a complete, fully integrated overhead materials-handling system.*

**WHITING CORPORATION**

**15601 Lathrop Ave.** **Harvey, Illinois**

*Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York 7, N. Y.*

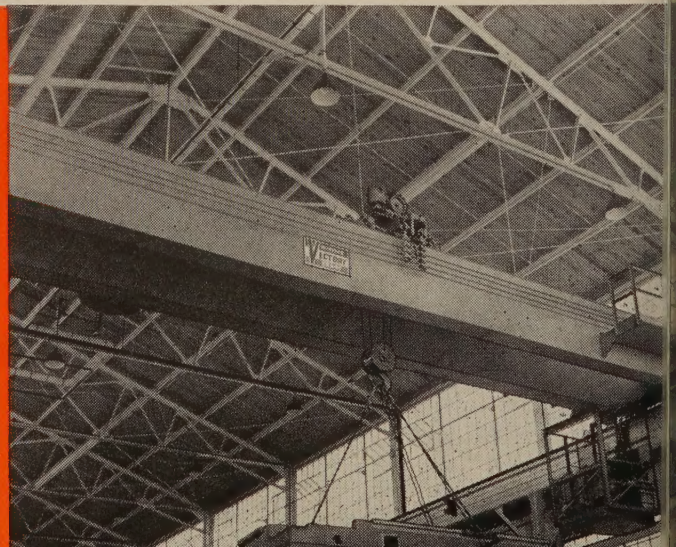
**Dependable · · Quiet-Running · · Durable**

# WHITING

**Overhead Traveling CRANES**

BUILDERS OF QUALITY CRANES

FOR OVER 60 YEARS



# Removing "DECARB"

## UNION COLD DRAWN
## CORRECTED" BARS

If you make steel parts which are heat treated to produce high surface hardness around a tough core—particularly those parts hardened by high frequency induction heating—here's an easy way to cut unit production costs: Use Republic Union Cold Drawn "Carbon Corrected" Bars.

Through carbon correction annealing in prepared atmosphere, the carbon lost by decarburization during hot rolling is restored to the surface of the bars, permitting them to be used in the original cold drawn condition. Thus, the cost of removing "decarb"—which in a steel like C-1050 frequently means the removal of 20 thousandths of an inch or more—is saved.

Because the treatment includes annealing as well as carbon correction, steels such as C-1050 and C-1151, frequently used for parts requiring high surface hardness, also are substantially improved in

**MACHINABILITY.**

That's a quality which you will *ALWAYS* find in every Republic Union Cold Drawn Steel—whether it's Bessemer screw stock, a carburizing grade or a stainless steel. MACHINABILITY comes first at Union Drawn—has taken precedence over everything else in laboratory and mill for some 58 years.

Union Drawn metallurgists and engineers are ready to help YOU in using "Carbon Corrected" or any other Republic Union Cold Drawn Steel Bars to best advantage—to improve your product, to increase production efficiency, to cut costs. Write us.

**REPUBLIC STEEL CORPORATION**
*Union Drawn Steel Division • Massillon, Ohio*
**GENERAL OFFICES • • • • • CLEVELAND 1, OHIO**
Export Department: Chrysler Building, New York 17, New York

*Republic*

REPUBLIC STEEL REG. U. S. PAT. OFF.

US

**UNION COLD DRAWN STEELS**

REG. U. S. PAT. OFF.

**Free-Machining Bessemer, Alloy and Enduro Stainless Steels**

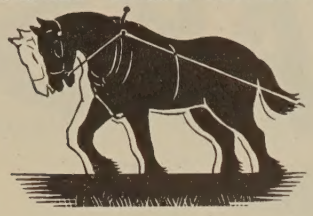
•

**Union Cold Drawn Special Sections**

•

**Union Cold Drawn and Ground Rounds; Turned and Polished Rounds; and Turned, Ground and Polished Rounds (Union Precision Shafting.)**

# You can work them harder...



# ...but don't make them sweat*

Molybdenum high speed steels are in many ways superior in performance to the equivalent tungsten steels, the main difference between them being that they require a somewhat different heat treatment.

Hardening temperatures are lower — operating costs are reduced — fuel is saved — furnaces and baths last longer and require fewer repairs.

## MOLYBDENUM HIGH SPEED STEELS

★Many toolhardeners judge the correct high-heat hardening temperature for tungsten (18-4-1) high speed steels by the appearance of 'sweat' on the surface. This rough and ready test is not applicable to Molybdenum high speed steels, which harden at lower temperatures. Our free booklet gives full information on heat treatment.

**Climax Molybdenum Company**
500 Fifth Avenue · New York City

MAIL THIS COUPON

Please send me a copy of your FREE BOOKLET

Name .....

Company .....

Address .....

MOLY

HS.I. IA. 9a


# Fatigue Cracks

BY C. T. POST

### He Was There

• • Most of these squawks about steel quality reflect sheer ingratitude to the persevering metallurgists who evidently will go to any end to document their research.

*Metals Technology*, that erudite chronicle of deliberations of the A.I.M.E., gives graphic evidence through an obscure bit of discussion related in the June issue. The problem at hand was the "Structure, Segregation and Solidification of Semikilled Steel Ingots," which apparently had caused endless difficulty to newer plants in the field. The speaker was H. W. McQuaid, whose lifetime of research entitles him to the dignity of a deacon in the metallurgical field. Declared Mr. McQuaid:

*"I know directly from my experience in small molds, big end up, the rate of rise is a very critical factor as the heat of the mold affects gas formation."*

Visualizing Mr. McQuaid in those hot molds, big end up, and suffering from gas evolution, gave us a flash of insight into some other metallurgical milestones the scientists discuss so glibly. We know now that the so-called McQuaid-Ehn test, which gave Mr. McQuaid a star for excellence early in his career, must have derived from the type of experience he describes above. The Ehn, obviously, is just what it sounds like, not the way it is spelled. We can't bear to contemplate the tortures suffered by the renowned Walter E. Jominy, whose famous end-quench test for hardenability helped win the war. The chest is no place to pin a Congressional medal for men like these.

### Poor Indian

*I was completely disconcerted when I saw the picture of the Indian in the advertisement on page* 118 *of your September* 9 *issue (Keokuk Electro-Metals Co.). He seems to be so happy about his success in balancing two different weights on the balance . . . so happy that he has twisted his hands around so that his thumbs are on the wrong side of his hands. While I can well imagine that such an inversion could take place, it appears highly improbable that a simple thing like weighing on a balance would give this result. I have seen accurate weighings made on scales of this type and*

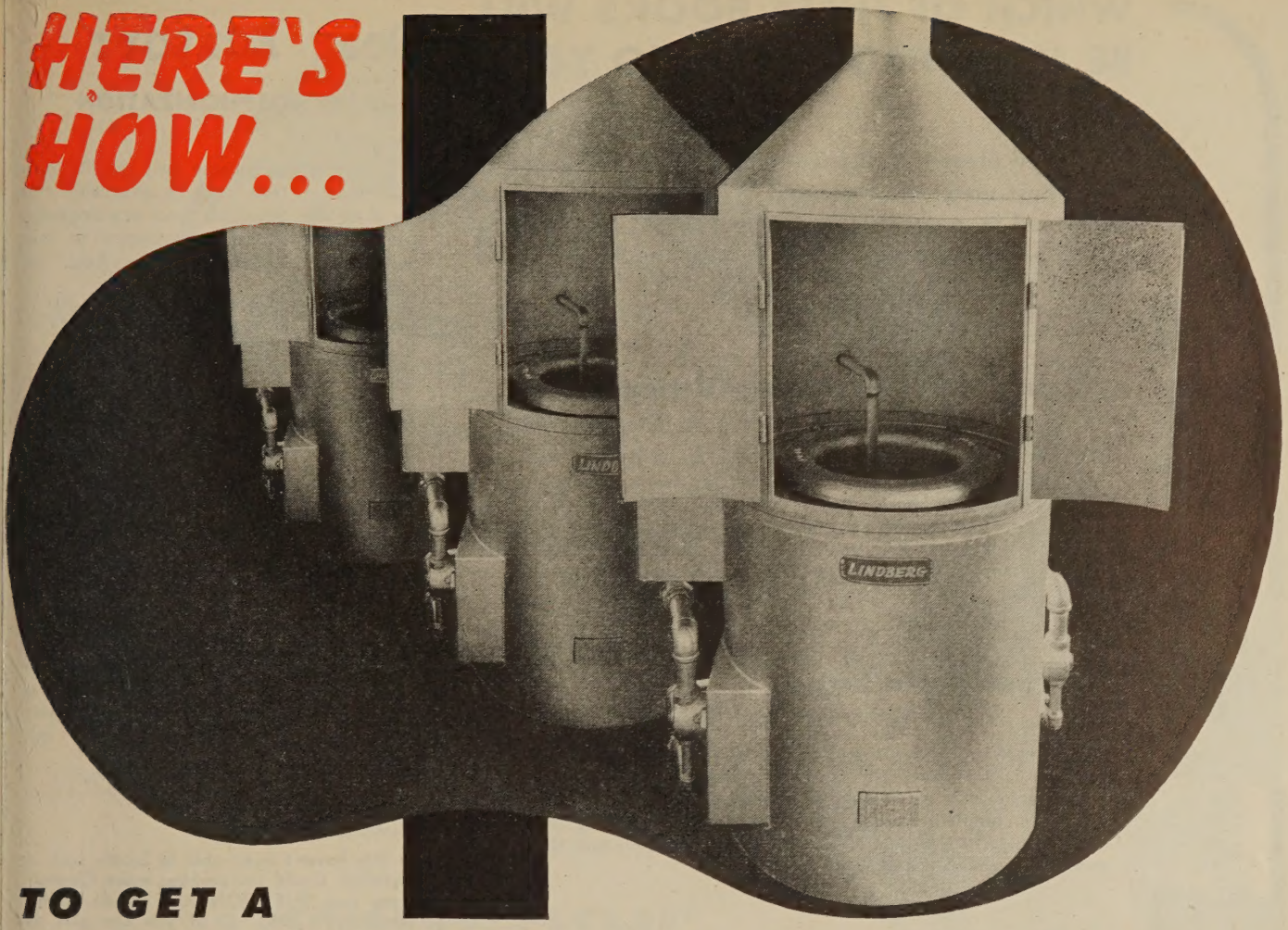
*of a much more accurate type in which the operators finish the weighing without any such anatomical inversions.*

*The only point about this picture which gives me encouragement is the fact that this apparently proves the rule which I have used for some years when in doubt about which is my left or right hand. This is the rule that when the thumb is on the left, that is my right hand.*

*Erle I. Shobert II,*
*Technical Director,*
*Rare Metal Contacts and Non-Ferrous Metallurgy,*
*Stackpole Carbon Co.*

• • That drawing of Chief Keokuk shouldn't bother you a bit. Probably it is a self-portrait. When the Chief came to his hands, he held them up in front of a mirror and drew them as he saw them. Mirrors lead to terrible frustrations. People who part their hair on the right side get a visual impression that the part is on the left. This eventually can lead to subversive tendencies if not corrected.

# HERE'S HOW...




## TO GET A

# 1 YEAR GUARANTEE

## ON YOUR CYANIDE POTS

**To introduce this unusual furnace we are offering to give you an unqualified guarantee for one year covering "Hi-Life" pots used with cyanide or lead (neutral salts excluded), under automatic temperature control.**

The first Lindberg "Hi-life" Pot Furnace was put in operation two years ago. With 15,000 hours of operation behind it, the original pot is still going strong. Others put into operation later have passed the 8,000 hour mark. We don't ask you to believe in miracles! So we're backing the performance records of these pots with a one year guarantee.

In addition to pot life two to three times the best previous figures, you also get much faster heating and greater efficiency. The new Lindberg "Hi-life" Pot Furnace is lined with Silicon Carbide and Mullite refractories assuring low maintenance in the furnace itself.

**Use the new Lindberg "Hi-Life" pots with the new Lindberg "Hi-Life" gas-fired Pot Furnace.**

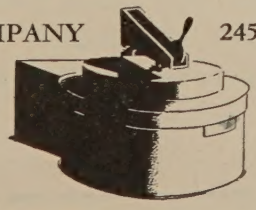
*The Lindberg Engineering Company considers this new development one of the most significant improvements in furnace equipment in the past decade.*

"Hi-Life" Pot Furnaces are available in these 4 standard sizes. (Note small overall dimensions)

| POT SIZE | | OVERALL SIZE | |
|---|---|---|---|
| 24" Dia. | 21" Deep | 39½" Dia. | 35½" Deep |
| 20" | 21" | 35½" | 35½" |
| 16" | 18" | 31½" | 32¾" |
| 12" | 18" | 27½" | 32¾" |

LINDBERG ENGINEERING COMPANY 2452 W. Hubbard Street, Chicago 12, Illinois

# LINDBERG FURNACES



# WHICH OF THESE BOOKS WILL BE MOST PROFITABLE TO YOU?

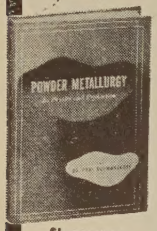
For √ new ideas √ the hard-to-find fact √ new processes √ the best material or method √ the underlying principle—and in many other ways these books can be helpful to you. Pick the ones you want most and SEE THEM ON APPROVAL.

1000 production aids.

## Illustrated Jig-Tooling Dictionary

*By T. G. Thompson and R. A. Peterson*

988 working drawings, with concise explanations, show you at a glance what you want to know about the design and construction of any piece of tooling equipment. Here is a wealth of up-to-date useful data not only on jigs and fixtures but also on machine tools, diemaking, plastic molding, welding and allied tools and procedures. A very handy reference for production department personnel as well as toolmakers.

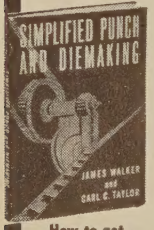



Shows you what powder metallurgy can do for YOU.

## Powder Metallurgy

*By Paul Schwarzkopf and Associates*

The inventor of the multi-carbide hard metals, new sintered iron and steel products, and many of the other powder metallurgical products and processes presents here the first complete explanation of the characteristics, industrial processes, products and underlying theory of metal powders. A wealth of production information and the latest postwar developments are included.




How to get your good ideas into production the best and easiest way.

## Simplified Punch and Diemaking

*By James Walker and C. C. Taylor*

This book by two expert toolmakers gives you the latest information on the methods and materials for the design and construction of all types of punches and dies used for fabricating sheet metal, together with clear how-to-do-it instructions. One tool and die maker of 30 years experience wrote that he found the book so informative and so interesting that he sat up nights reading it! Full reference tables are included.

Increase your production and profits with successful supervision.

## Improved Foremanship

*By Auren Uris*

Conversations between a new foreman and his fellow workers bring out in specific, down-to-earth terms everything that a production supervisor must know to be successful and how he can best learn it. Foremen and top management people alike have put their stamp of hearty approval on this book as one of outstanding helpfulness and benefit to all concerned.

**SEE THEM FREE**

Use this coupon to get copies of any of these books ON 10 DAYS' APPROVAL. If you are not wholly convinced of their value to you, you may return them without charge.

**THE MACMILLAN COMPANY, 60 FIFTH AVE., NEW YORK 11**

Please send me on 10 days' approval copies of the books checked at left.

☐ Illustrated Jig-Tooling Dictionary ...$7.50
☐ Powder Metallurgy $8.00
☐ Simplified Punch & Diemaking ...$5.00
☐ Improved Foremanship ..$3.50

Signed .....
Address .....
.....
Company .....


# Dear Editor:

## ORE DEPHOSPHORIZATION

Sir:

I would appreciate any additional information that may be available regarding the Swedish iron ore dephosphorization process mentioned in the Newsfront section of your Aug. 19 issue.

*WM. W. AUSTIN, JR.*
*Metallurgist*
*Southern Research Institute*
*Birmingham*

● The process, which consists mainly of concentrating the ore and extracting phosphorous by acid treatment, is to be used in a new plant being erected by the Grangesborg Co., Stockholm, Sweden. They can give you further information on the procedure.—Ed.

## "CHRONITUM" — ?

Sir:

Please furnish any information you might be able to give on what a material known as "Chronitum" is. We are particularly interested in analysis, sources of supply and treating instructions.

*J. C. HOOVER*
*Director of Purchases*
*Burke Steel Co., Inc.*
*Rochester, N. Y.*

● We haven't been able to locate such a material. Could you perhaps mean Chromidium (see THE IRON AGE Trade Name Directory, p. 28). Or if you can give us more information as to the type of material it is, its usage, etc., perhaps we'll have better luck. Is any reader familiar with it?—Ed.

## HEAT TREATING

Sir:

Kindly send me a copy of "Modern Heat Treating—A Reference Index" which you published in the June 10 issue.

*N. W. MARR*
*Metal Trades Laboratory*
*Tech. Service & Development Div.*
*American Cyanamid Co.*
*Stamford, Conn.*

## FUME CONTROL

Sir:

Newsfront in your Aug. 5 issue mentions the Pease-Anthony venturi scrubber. Can you advise us where we could obtain further information?

*A. POINTEAU*
*Technical Manager*
*Ets O. G. Pierson*
*Paris, France*

● Use of the scrubber in one of Republic Steel Corp.'s plants is described in the article "Openhearth Fume Control" in the Sept. 9 issue.—Ed.

## SCRAP SPECIFICATIONS

Sir:

Have you a pamphlet describing various classifications of steel scrap? If this information is available, please

"OPERATOR GET

# BElmont 5-4266

. . . CHICAGO, PLEASE"

## GET SPECIALIZED STEEL SERVICE

All that's different is the number—Chicago telephones go on a two-letter dialing system September 18th. Results are the same as always—*action* and *satisfaction!* So when you want real service on the kinds of steels in which we specialize—call GENSCO—at headquarters, BElmont 5-4266 or the office* nearest you.

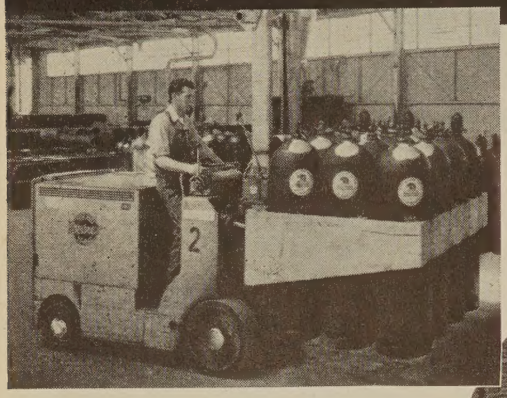
**GENSCO**

COLD FINISHED BARS • SHAFTING • TEMPERED AND ANNEALED SPRING STEEL • DRILL ROD • SHIM STEEL • COLD ROLLED STRIP STEEL • COILS AND STRAIGHT LENGTHS • ROUND EDGED STRIP STEEL • FEELER GAUGE • ROUND WIRES • STEEL BALLS

**GENERAL STEEL WAREHOUSE CO., INC.** *1830 N. Kostner Ave., Chicago 39, Ill.*

*CINCINNATI Dunbar 5174 • MILWAUKEE Broadway 2-7629
ST. LOUIS Wydown 1368 • NEW YORK Vanderbilt 6-2750
MINNEAPOLIS Bridgeport 1119 • GRAND RAPIDS Grand Rapids 3-6328

# DOW CHEMICAL saves thousands of dollars annually with BAKER TRUCKS



*Baker Fork Truck with Trayner-Reinhart cylinder carrier easily transports twelve 16" cylinders.*

*Bagged material, stacked on pallets as it comes from the line, is tiered to the ceiling in storage.*

● At the Pittsburg, California, plant of The Dow Chemical Company, five Baker Fork Trucks expedite handling of material in production, storage and shipping departments.

Two of these trucks, one of them fitted with a Trayner-Reinhart cylinder carrier, transport 16" cylinders of ammonia—twelve at a time—from production to warehouse and from warehouse to shipment. Trucks load cylinders directly into boxcars, or onto highway trucks.

*Cartons of finished chemical products are handled in pallet loads to save manual handling in transporting, storing, and car or truck loading.*

The remaining trucks speed handling of chemical products in bags or cartons on pallets—taking them from production to storage, where they are high-tiered to conserve floor space, and from storage to shipment, where further man-hour savings are made in loading.

Prior to the installation of the Baker Trucks, material was transported manually and hand-stacked. Cylinders were rolled by hand, one at a time. The use of the trucks has resulted in savings of thousands of dollars annually over former methods.

**BAKER INDUSTRIAL TRUCK DIVISION**
*of The Baker-Raulang Company*
**2175 WEST 25th STREET • CLEVELAND, OHIO**
*In Canada: Railway & Power Engineering Corp., Ltd.*

**Baker INDUSTRIAL TRUCKS**


direct same to the attention of the writer.

*W. BERT BAYER*
*Purchasing Agent*
*F. L. Heughes & Co., Inc.*
*Rochester, N. Y.*

● The Yearbook of the Intitute of Scrap Iron & Steel, Washington, contains all the various scrap classifications and definitions. They will send you a copy.—Ed.

## CONVERSION TABLES

Sir:

We have been trying to purchase a book showing "pounds avoirdupois converted into gross tons," and will appreciate it if you can advise us as to where we can obtain such a book.

*M. PEACOCK*
*Accounting Dept.*
*Simon Iron & Steel Corp.*
*Lansing, Mich.*

● We have ordered a book containing the conversion table and will send it along as soon as we receive it.—Ed.

## IRON ORE PRICES

Sir:

Could you send me information or sources thereof on prevailing lower lake port prices for Mesabi iron ores?

*J. D. CLENDENIN*
*Asst. Professor*
*Pennsylvania State College,*
*School of Mineral Industries*
*State College, Pa.*

● A tear sheet of one of our weekly price pages showing Mesabi and other ore prices, delivered at lower lake ports, has been mailed.—Ed.

## PIPE MAKERS

Sir:

Please send us any available list that you have giving the names and addresses of producers of steel tubular products.

*J. JOS. W. PALMER*
*Chief, Iron & Steel Sect.,*
*Commodities Div.*
*Dept. of Commerce, Office of*
*International Trade*
*Washington*

● A list of pipe and tubing producers has been sent.—Ed.

## TOOL STEEL CHARTS

Sir:

Please send me two copies of "Comparative Tool Steel Brands" published in your July 29 issue

*C. H. JUNGE*
*Engineering Dept.*
*Cleveland Graphite Bronze Co.*
*Cleveland*

● Unfortunately the demand for copies of these charts has completely exhausted our supply of tear sheets. However, our new edition of the "Directory of Tool Steels" contains the charts. Copies are $2.00 each, or $1.50 each for 3 to 5 copies and $1.00 each for 6 or more.—Ed.

## TIME STUDY COMPUTATIONS

Sir:

Is it possible to obtain tear sheets of the article "Right and Wrong of

CRESCENT PALLETIER FORK TRUCK

CRESCENT PALLETIER FORK TRUCK

# Battery Electric Trucks and EXIDE-IRONCLAD® BATTERIES

## Speed up materials handling . . . cut costs

Every day, more and more companies are discovering the faster, safer and more economical way to handle materials. They are giving the job of lifting, hauling and stacking to the efficient battery electric truck. Time is being saved . . . more tons moved per man per hour. Handling costs have been cut as much as 50%. And more storage space is being utilized by high tiering.

When electric trucks are powered with dependable Exide-Ironclad Batteries, they keep on the job day after day . . . and all day long.

The unique construction of Exide-Ironclad Batteries results in all four of the vital characteristics of a storage battery: *high power ability, high electrical efficiency, ruggedness* and *long life.*

Speed up your material handling. Cut handling costs. Put Exide-Ironclad Batteries and Battery Electric Trucks to work in your plant.

Write for further particulars and FREE copy of Exide-Ironclad Topics which covers latest developments in material handling and shows actual case histories.

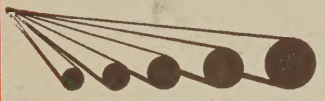
DEPENDABLE POWER

**1888 . . . Dependable Batteries for 60 Years . . . 1948**

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • *Exide Batteries of Canada, Limited, Toronto*

PAGE
Stainless Steel
WIRE

ROUND



FLAT

OR

SHAPED

**Page for Wire—Especially Stainless**

Remember that the next time you are looking for a responsible source for stainless steel wire. Wire has always been the business of PAGE. And PAGE has been working with stainless ever since its earliest development.

Whatever problem you may have involving wire—

*Get in touch with Page!*

ACCO

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Pittsburgh, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

*In Business for Your Safety*

Time Study Computations" from the Aug. 17, 1944, issue?

*WILLIAM JACKO*
*Representative*

*United Steelworkers of America*
*Pittsburgh*

● Tear sheets of the article are on their way.—Ed.

## SCRAP STEEL FOR SALE

Sir:

We have on hand a carload of No. 1 scrap steel and wonder if you would suggest a possible buyer.

*BRADFORD SANDERS*
*Secretary*

*Sanders Co., Inc.*
*Elizabeth City, N. C.*

● After this appears, your mail carrier's load is likely to be considerably heavier. We have sent you, however, a list of members of the Institute of Scrap Iron & Steel—any of these companies should be in a position to handle the scrap.—Ed.

Sir:

We have on hand two or three carloads of scrap iron car wheels which we would like to dispose of. . . . We will appreciate it if you will wire us at our expense the names of consumers or brokers paying the price you are quoting.

*W. C. WENTZEL*
*President*

*Wilkes-Barre Iron Mfg. Co.*
*Wilkes-Barre, Pa.*

## CONTINUOUS CASTING

Sir:

We would appreciate receiving from you two reprints of the article "Continuous Casting of Semifinished Steel" from the Aug. 19 issue.

*M. L. BAUER*

*Hoyland Steel Co., Inc.*
*New York*

## SOFT METAL HARDNESS TESTS

Sir:

Kindly send me tear sheets of the article "Hardness Testing of Soft Metals" which appeared in the issue for June 24.

*L. P. TARASOV*
*Research Laboratories*

*Norton Co.*
*Worcester, Mass.*

## STAMPINGS

Sir:

Will you kindly send us tear sheets covering an article "Stampings for Welded Fabrication" which is in your issue of Dec. 11, 1947.

*J. C. GRAF*

*John C. Graf Co.*
*Philadelphia*

## WELDING CLAD STEELS

Sir:

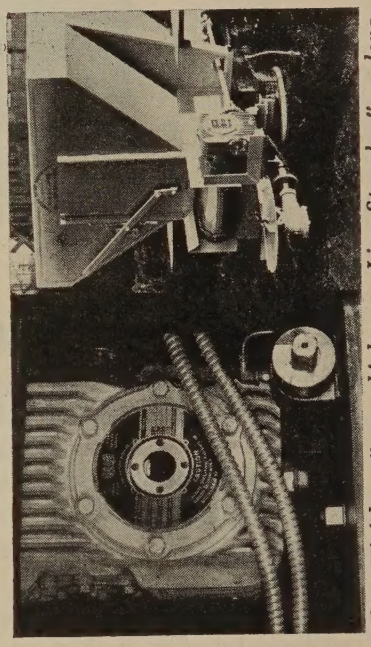
Kindly send us a copy of the article **"How to Weld Clad Steels"** from the July 22 and 29 issues.

*TH. I. LESTON*
*Director of Production*

*Alpine Metals Mfg. Div. Alpine Trading Co.*
*New York*

● We regret that the demand for this article has exhausted our supply of tear sheets.

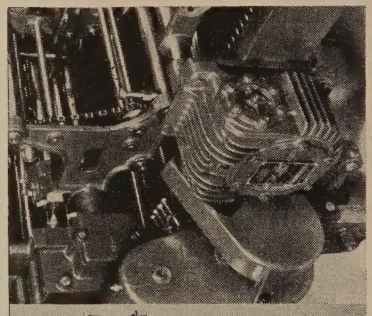
Where SMALLER GEARS mean LONGER LIFE



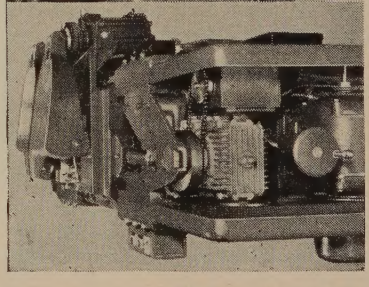
*Lime Spreader ". . . longer life with shock loads"*

*Gear Finishers ". . . higher product accuracy, longer life"*

Here are just a few typical examples where Cone-Drive gearing in STANDARD REDUCERS save space AND increase life—due to Cone-Drive's "more teeth in contact and more contact per tooth." How much space will they save you? Ask for Bulletin #8901B.



*Packaging ". . . better than a bigger gear box"*



*Welders ". . . longer life with higher loads"*

CONE-DRIVE DIVISION
MICHIGAN TOOL COMPANY
7171 E. McNICHOLS RD., DETROIT 12, U. S. A.

# Close-up of *DANGER!*

The main bearing of this small crankshaft was originally finished by a mechanical sanding machine. Then it was partially Superfinished—just enough to reveal the lack of adequate bearing capacity. Light abraded areas are the only true geometrical surface. Dark areas are low spots which carry no bearing load. The area contact of the Superfinishing stone brings out deficiencies in production which were never intended by the designing engineer.

For more information on Superfinishing, write on your company letterhead for the new textbook, "Wear and Surface Finish."

GISHOLT MACHINE COMPANY
*Madison 10, Wisconsin*

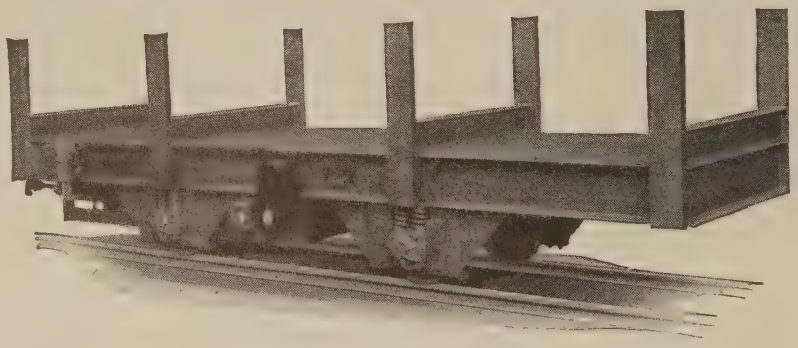
*THE GISHOLT ROUND TABLE*
represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

ATLAS

INTRAPLANT HAULAGE EQUIPMENT

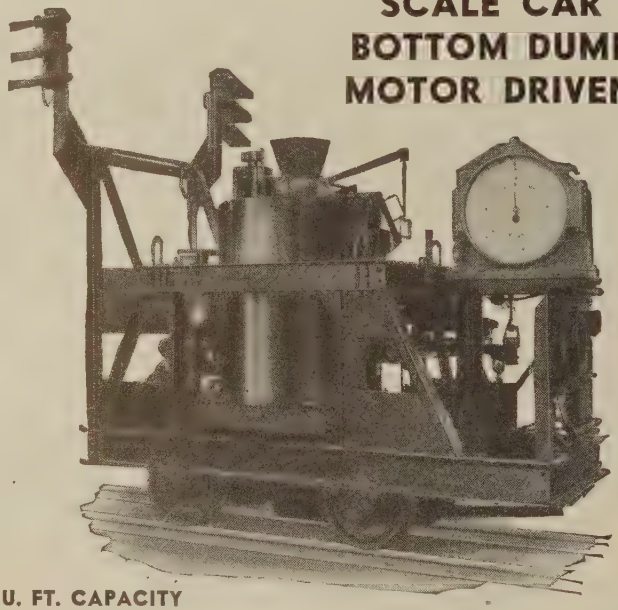
SPEEDS PRODUCTION

10 TON STORAGE BATTERY FLAT CAR



Built for handling pipe and conduit. Powered by storage battery. Geared to travel at walking speed when controller is held in operating position. Automatic "shut-off" and brake applied when spring return handle of the controller is released.

ELECTRIC SCALE CAR BOTTOM DUMP MOTOR DRIVEN



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however, all the material in the article is to be included in a booklet published by Lukens Steel Co., Coatesville, Pa. They will send you a copy as soon as the booklet is printed.—Ed.

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# Man and Master

ENLIGHTENED students of industrial relations in this country are disturbed and perplexed by the failure of substantial material progress to improve the worker's attitude toward his job.

Allowing for taxes and changes in the value of the dollar, the coal miner has improved his income by 91 pct since 1930, the textile worker by 39 pct, the automobile worker by 32 pct, the railway worker by 22 pct. These are spectacular, real gains achieved in less than a generation.

By contrast, the railroad executive is 22 pct worse off than he was in 1930, the Congressman 26 pct, the pensioner 35 pct, the bondholder 38 pct, and the wealthy stockholder 69 pct. An examination of total national income likewise reveals that the share which goes to the worker as a class is bigger than it was two decades ago. Experience thus registers a complete inversion of the Red-tinted myth that the rich are getting richer and the poor poorer.

It might seem that better real pay, shorter hours, better working conditions, greater leisure, dominant power at the bargaining table, and much better organization would result in a higher level of contentment. Such, however, is not the case. This is proven not only by the figures of man-days lost in labor disputes but also by the ugly and recurring headlines of strike violence.

Furthermore, an examination of rates of pay within the working group itself shows that the incidence of labor trouble tends to vary directly with the position of the working group in the pay scale. In other words, it is almost an axiom that the higher the rate of pay the greater the unrest of the employees and the more likely the resort to strikes. In construction, the manufacture of electrical equipment, the automobile and steel industries, maritime and railroad transportation, together with coal mining, are found the highest paid workers in America - which means the world. Yet it is precisely in these fields that we find some of our most persistent and most refractory labor problems. Here as elsewhere it is clear that man does not live by bread alone. The necessary ingredients of satisfactory labor relations still seem to elude many large employers in this country.

It is for this reason that a dispatch in *The New York Times* from Thornecliffe, England, attracted our attention. It described an integrated steel operation in a valley near Sheffield. Nationalization of steel is on the agenda of the Labor Party. Private steel managements generally, and Sir Harold West, the young and vigorous director of the Sheffield operation in particular, are trying to forestall this collectivist fate.

In describing his efforts to justify private operation, Sir Harold was taxed by the reporter for production methods that were obsolete. "You are well ahead of us on production techniques - due partly to your immense internal market," he acknowledged, "but Britain is ten years ahead of you on labor-management relations. We have very nearly solved here the problem of Man and Master in industry."

If Sir Harold is correct in this, then American industry has a lesson to learn from the English - a lesson whose learning can ill afford postponement.

*Joseph Stagg Lawrence*

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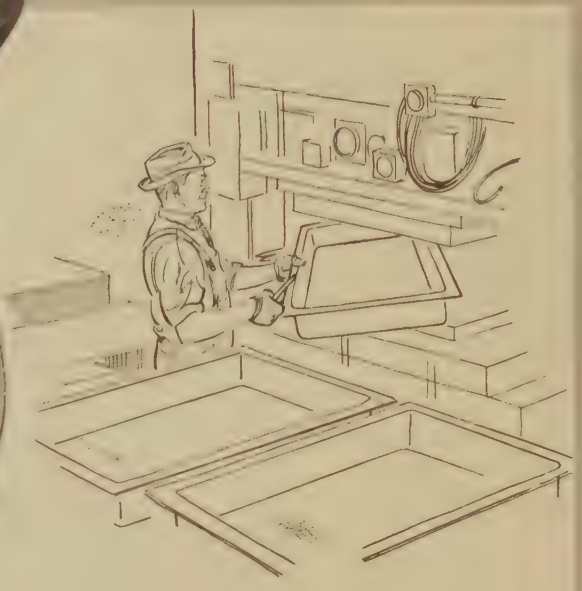

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► By the time the battle against f.o.b. mill selling is won in Congress -- if it is won -- rising rail freight rates may make it impossible for steel companies to compete in many distant areas even though they may be legally entitled to do so. Legal experts who have given up hope of a changeback are advising companies planning to move nearer steel sources to do so now if other factors are favorable.

► Some government officials feel that the voluntary allocation of steel, now about 10 pct of total output, has just about reached its peak. They believe the program can be expanded safely to include up to 20 pct of total output. But the Commerce Dept. feels that the program is now somewhere near the point where additional allocations of large tonnages would be dangerous from the standpoint of economic dislocation.

► Electric furnaces now on order will be able to produce over 600,000 tons of carbon steel annually -- and most of them will be put to work on carbon steel as soon as they are installed. Aside from these, steel companies have several other electric furnaces in the planning stage.

► Tests conducted by Budd Co. and AAR on the importance of wheel balance and degree of wheel roundness for smooth railroad car operation at high speeds may lead to the development of new grinding equipment for wheel finishing. Present specifications call for turning only. Tests show that a concentrated weight of 5 lb of the rim of a standard 36-in. diam 900 lb wheel on a car moving at a speed of 100 mph was found to be equivalent to a pull of 1-ton.

► Another reason for the scrap shortage is the fact that postwar auto scrappage is about one half prewar levels. From 1938 to 1941 an average of 2,275,000 passenger cars and trucks were scrapped. The 1946 total is only 855,000. If the 1947 figure were available, most sources believe it would show only a mild increase, if any. Statisticians find that the average lifetime mileage per vehicle has tripled in the last 20 years and the average age before being scrapped has doubled.

► Most steel producers are systematically eliminating gray market customers. Although many insisted that they did not sell to gray market brokers or warehousemen, some had a little weeding out to do when the Congressional Investigating Committee took an active interest in such selling practices.

► Transformer makers are low temperature annealing all silicon sheets of the preferred oriented grain structure type because the mills will not guarantee the electrical characteristics. This steel has a very low watt loss when properly annealed. Recently such steel has been used in transformers as large as 10,000 kva. First applications were on the smaller transformers of the audio type, 1 kva and under.

► A number of new faces are making their appearance in the scrap industry -- most of them with an ambition to earn a few extra dollars by importing German scrap. Some of them have never heard of the Joint Export Import agency or of the proposed single corporation for purchasing scrap abroad. Tonnages that are being offered run up to 200,000 tons f.a.s. somewhere over there. What some people are wondering is how independent sources can pry loose 200,000 tons of scrap from Germany of supposedly good quality considering all the restrictions?

► A needle bearing maker is considering the redesign of all bearings used with small connecting rods for 2-cycle engines. Recent rod developments have proved that a new method of lubrication of such bearings is feasible which will give much longer lasting bearing life.

► Voluntary allocation for bituminous coal mining machinery may be shelved permanently because this country's coal stocks are the highest in 5 years. Ruhr production has increased tremendously and mining machinery makers are cutting back production schedules for next year.

► Extensive revisions in specifications of mild and low alloy steel arc-welding electrodes are about to be released by the American Welding Society and the American Society for Testing Materials. Also to be released are specifications for corrosion resisting chromium and chromium-nickel steel welding electrodes and copper and copper-alloy metal arc-welding electrodes.

► Estimated gain in the domestic sale of automobile replacement parts during 1947 was 34 pct higher than the previous year and 228 pct over 1941. Assuming a 65 pct increase in prices, the estimated increase in raw material requirements, including steel, is more than 160 pct since 1941.

# Properties of Copper Brazed Joints

***Experiments on joint clearance, shear strength, elevated temperature strength, heat treating and other factors affecting brazed joints were made on brazed assemblies using an NE steel, two SAE carbon and four SAE alloy steels. The results of these tests are discussed in this article.***

By G. B. WILKES, Jr.
*Thompson Laboratory, General Electric Co., Lynn, Mass.*

FURNACE brazing has been used primarily in joining low-carbon steels, and to some lesser extent in joining high-carbon or alloy steels. The lack of data on the properties of bonds obtainable in furnace brazing limits its full utilization. The results of tests made on copper-brazed high-carbon and alloy steel samples have developed some specific data for direct application. The number of specimens and the diversity of test conditions, including size, shape, and material, are limited. While these data are directly applicable only for identical conditions, they may serve as a guide for other applications.

In furnace copper brazing, heating is done in a reducing atmosphere at 2050° to 2100°F. If cooled in the same atmosphere, the parts emerge clean and bright and can be used as such, or painted without further surface treatment. In most cases copper brazed assemblies may be heat treated without materially affecting the joint.

No flux is needed if the atmosphere used will reduce the oxides of the materials. The most common laboratory atmosphere is pure hydrogen but for the average application atmospheres containing reasonable percentages of hydrogen and/or carbon monoxide are satisfactory. A furnace consisting of a heating chamber with attached cooling chamber is recommended. This may be a tray, continuous belt, or roller fed type, depending on quantity and weight of articles handled.

There are two general occasions when copper brazing should be given consideration. The first is if parts must be rigidly joined together. This applies, generally, to small assemblies where riveting or threading are not sufficient and where welding would be difficult or objectionable from an appearance or service standpoint. Examples of this are shown in fig. 1. Fig. 1A shows a 3-piece assembly that eliminated failures previously encountered when the parts were staked. Fig. 1B, a traffic timer, consists of three pins brazed to a plate that acts as a lever. The aircraft engine support shown in fig. 1C, is interesting because failure would cause complete loss of engine and plane. Every unit was proof-loaded without failure before use at ten times the rated load. The second general use of furnace copper brazing is to join several parts together to make what otherwise would have been machined from one piece, thereby saving material, machine time and labor. Examples of this

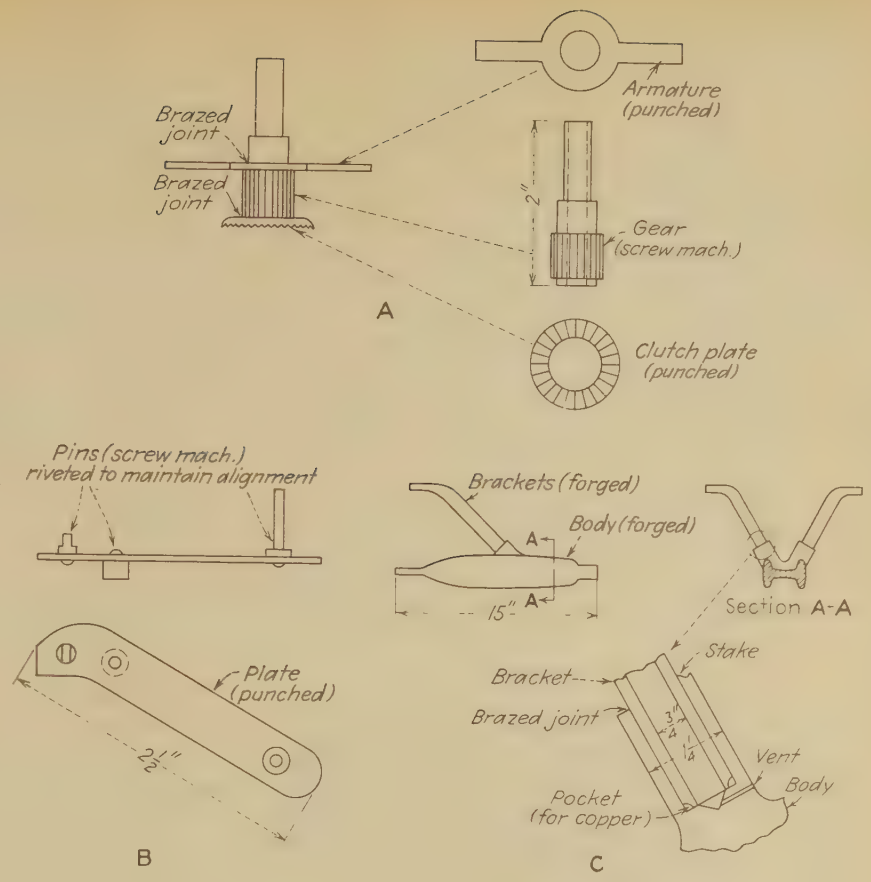



*FIG. 1 - Copper brazed parts where other methods of assembly are impractical. A - This magnetic clutch-armature and clutch plate are brazed to the gear. Failures with previously staked assembly were eliminated. B - In this traffic timer lever, three pins are brazed to a plate. C - Aircraft engine support brackets are brazed to the body. Note vent to relieve expanding gas in hollow arm.*

are shown in fig. 2. Fig. 2A shows a thrust plate brazed to a bearing shell and fig. 2B shows details of brazing the ring and keys to a commutator shell.

In designing for furnace copper brazing, several items must be considered and correctly settled. Most of these items as they apply to specific materials are discussed in the experimental results that follow; but a general discussion of these factors will help in understanding these results.

The most important step is the proper choice of material. Any material to be copper brazed must be free of appreciable amounts of elements whose oxides are not reduced by the atmosphere to be used. Any oxide present while the copper is molten effectively blocks its flow through the joint. Those elements normally found in steel

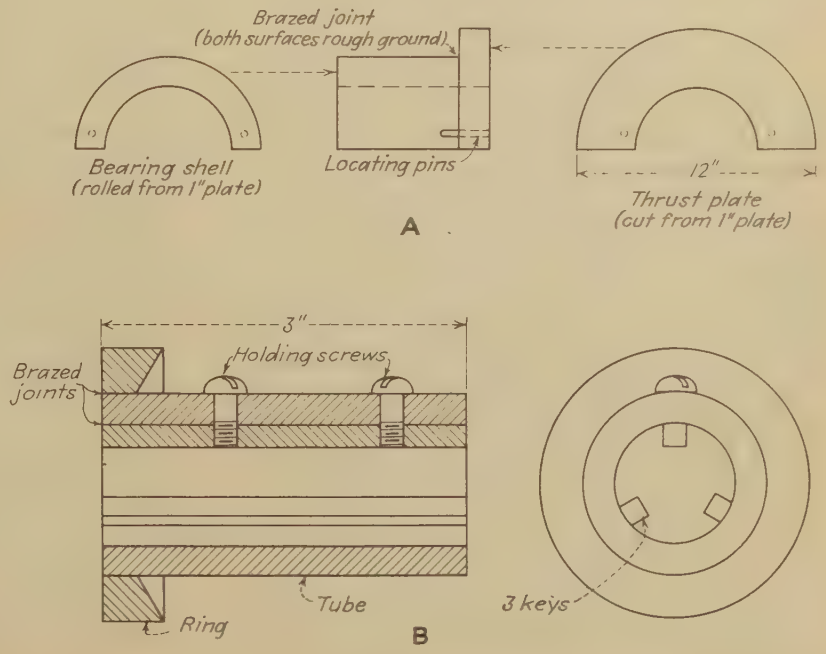



*FIG. 2 - Copper brazing to save material and labor. A - Thrust plate brazed to bearing shell. Formerly this part was machined from solid stock and now is fabricated from 1 in. plate. B - Commutator Shell, ring and keys brazed to tube. Formerly this was machined from solid stock but now it is fabricated from two sizes of tubing and square key stock.*

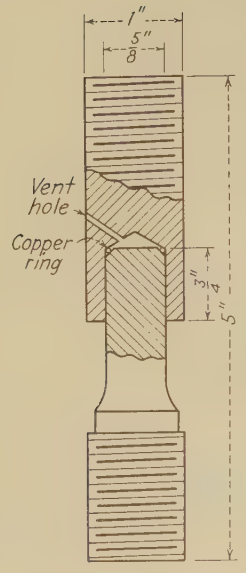



*FIG. 3 - Test bar used in brazing experiments.*

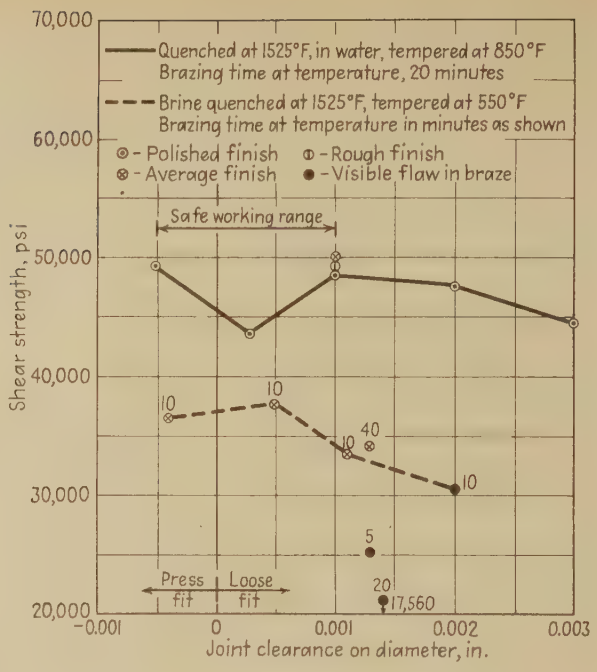



*FIG. 4 - Strength vs joint clearance, SAE 1040.*

whose oxides are not reduced by hydrogen saturated with water vapor at 70°F are chromium, manganese, silicon, aluminum and vanadium. Less than 1 pct total of these elements will cause no trouble in brazing, but more than 2 pct total of these elements may require use of a flux or a pure dry hydrogen atmosphere in a special furnace. Where the total of these so-called bad elements is between 1 and 2 pct, actual experiment on the part is best for determining brazing characteristics, and rather careful inspection of production work is recommended because of normal analysis variations in commercial steels of the same type.

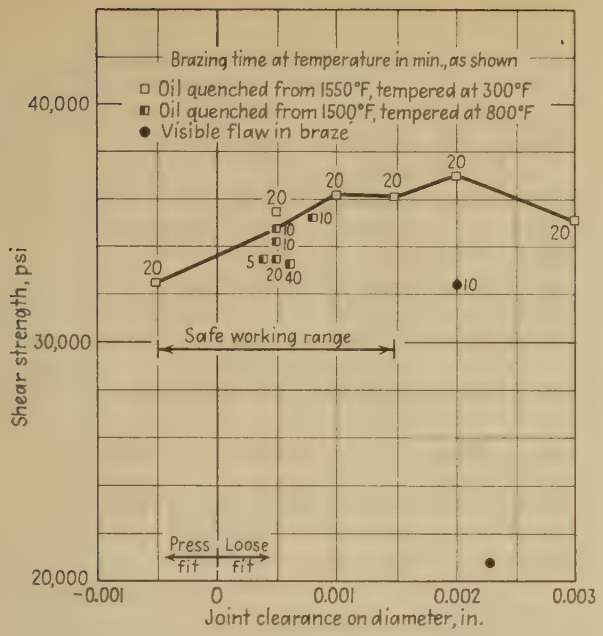
There are several commercial fluxes that permit use of steels otherwise unsatisfactory for brazing. They should be used with caution, however, since certain types of joints can trap considerable flux and still give the appearance of a good braze. Again, actual experiment is the best way to determine whether or not flux is safe to use.

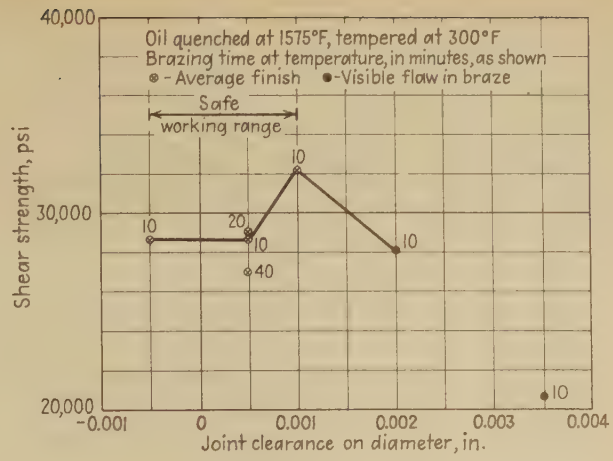
Copper, extremely fluid when molten, depends on wetting and capillary attraction to draw it throughout a joint and hold it there. The rate at which this penetration occurs is increased as the joint becomes tighter up to a light press fit and as the surfaces become rougher up to a reasonable point. Heavy press fits should be used with caution. No general figures can be given for joint clearances since they vary with the size and shape of the part as well as service requirements. The highest strength joints are those with small or no clearance, in which cases strengths up to 2½ times that of copper may be obtained. As clearance increases strength falls off toward that of pure copper, and gas tightness of the bonds is reduced. The higher strength of the tight joints is believed to be mainly the result of the alloying action between the iron and copper, producing an iron-copper alloy in the joint. Slightly rough surfaces speed up both joint penetration and the alloying action. In cases where the copper must flow over an open surface before reaching the joint a slightly rough surface is essential. Normal tool marks or light roughening by pickling or grit blasting make satisfactory surfaces. Sand blasting is liable to leave sand particles imbedded in the joint interfaces which would interfere with wetting and copper brazing.

To obtain some quantitative data on copper brazed joints, a number of special test bars were made from each of seven commonly used steels. The test bars were made as shown in fig. 3 with the joint clearance (or interference) measured accurately before the pieces were assembled. The copper, an 0.060 in. diam wire ring, was placed within the joint as shown and the pieces assembled. The data that follow apply directly only to this type and size of part; and any other set of conditions may give somewhat different results. Attention should be called to the small vent connecting to the cavity at the top of the joint. This is necessary for hollow parts to prevent blowing the assembly apart as a result of the expansion of the trapped air as it is heated for brazing.

The test bars were brazed upright in the position shown in the sketch so that gravity would help the flow of copper. The assembled bars, supported in a graphite block on a tray, were placed directly in the heating chamber of an electrically heated hydrogen atmosphere box-type furnace at 2050°F and then cooled in hydrogen in an attached water jacketed chamber. Most of the following data are results from two separate series of experiments, one to test surface finish with a constant brazing time of 20 min at temperature, and the other to test brazing time with a constant average finish.

After brazing, all bars were normalized from 1650°F and heat treated normally for the material. Normalizing and hardening were done in a box-type electric furnace and tempering in a forced convection oven. Normalizing is advisable as a grain refiner after brazing if the parts are to be heat treated.




*ABOVE*

*FIG. 6 - Strength vs joint clearance, SAE 4140.*

*LEFT*

*FIG. 5 - Strength vs joint clearance, SAE 2335.*

The nominal analyses of the steels tested were as follows:

CHEMICAL PROPERTIES, PCT

| Steel Grade | C | Mn | Si | Ni | Cr | Mo | V |
|---|---|---|---|---|---|---|---|
| SAE 1020..... | 0.20 | 0.45 | 0.25 | — | — | — | — |
| SAE 1040..... | 0.40 | 0.75 | 0.25 | — | — | — | — |
| SAE 2335..... | 0.35 | 0.70 | 0.25 | 3.5 | — | — | — |
| SAE 4140..... | 0.40 | 0.75 | 0.25 | — | 0.95 | 0.20 | — |
| SAE 4340..... | 0.40 | 0.65 | 0.25 | 1.75 | 0.65 | 0.35 | — |
| SAE 6150..... | 0.50 | 0.75 | 0.25 | — | 0.95 | — | 0.18 |
| NE 8744..... | 0.44 | 0.88 | 0.28 | 0.55 | 0.50 | 0.25 | — |

The safe range of joint clearances in the curves shown are limited on the tight side by the limit of the tests and on the loose side more by the appearance of poor brazes than by the loss of strength.

The first series of pullout shear-strength tests, fig. 4, was on copper brazed and normalized parts made of SAE 1040, brine-quenched from 1525°F and tempered at 550°F (lower curve). The second series was on similar samples water-quenched from 1525°F and tempered at 850°F (upper curve). The marked difference in strength between the two curves is not the result of the tempering temperatures, but to the more drastic quench (brine, v. water). The nominal strength* of this steel treated as described is 130,000 psi for the brine quench and 550°F temper, and 120,000 psi for the water quench and 850°F temper.

** All the strength values for the steels are estimates based on the curves in "Properties of Frequently Used Carbon and Alloy Steels" Catalog No. 172, Bethlehem Steel Co.*

SAE 1040 gives the highest joint shear strength of any of the seven materials tested, but is, unfortunately, the most sensitive to clearance in the joint. The curves in fig. 4 show a small, but definite drop with increased joint clearance. Although the drop shown is not excessive, several of the test bars with clearances of 0.0014 to 0.002 in. showed poor brazes, which reduced the total joint strength by as much as 50 pct. Designs calling for this material to be copper brazed should be dimensioned to give not more than 0.001 in. clearance on diameter, working into press fits to give reasonable tolerances.

For applications not requiring heat treatment for strength, low-carbon iron or mild steels, such as SAE 1010 or 1020, are recommended, since they give the least trouble in brazing if the joints are tight, and are least expensive.

Fig. 5 shows the results of similar tests on SAE 2335. After copper brazing all bars were normalized from 1650°F—one set was quenched from 1500°F and tempered at 800°F; the other was oil quenched from 1550°F and tempered at 300°F. The nominal strength of this steel treated as described is 180,000 psi for the 800°F temper and 260,000 psi for the 300°F temper.

While giving a lower average shear strength than SAE 1040 water quenched, these results are remarkably consistent regardless of fit, brazing time, or surface finish. Two bars did not braze completely, but the clearances in the joints were 0.0020 in. and 0.0023 in. on the diameter. Design tolerances for use with this material could be set to run as high as 0.0015 in. clearance on diameter. This material brazes well, as is shown by the consistency of the data. The presence of a small amount of nickel plus the low content of bad elements both contribute to the ease of brazing.

SAE 4140 is a steel containing close to the maximum of bad elements. Copper-brazed test bars of this material were normalized from 1650°F, oil quenched from 1575°F, and drawn at 300°F. The nominal strength of this steel so treated is 300,000 psi. Test results are shown in fig. 6. Here again, brazing time shows no appreciable effect. Surface finishes were all average. The curve shows no marked loss of strength up to 0.002 in. clearance, but examination of the test bar with an 0.002 in. clearance and one of 0.0036 in. clearance showed a somewhat questionable braze. A design clearance maximum of 0.001 in. on diameter should be safe, using press fits, as in SAE 1040, to increase working tolerances.

SAE 4140 can be copper brazed, but is a borderline steel from a composition standpoint and is best not used if a more satisfactory substitute is available. Experience has shown that if

the specific analysis happens to be on the high side for Mn, Si, and Cr the material may braze poorly. The standard range of analysis permits a variation of the total of these elements from 1.15 pct, min, which should braze satisfactorily, to 2.30 pct, max, which is high enough to give trouble. This steel has been production brazed successfully, but considerable attention was paid to surface finish and atmosphere.

Another steel that is questionable for copper brazing is SAE 6150, similar except for vanadium, to SAE 4140. Copper-brazed test bars were normalized from 1650°F, oil quenched from 1575°F and tempered at 1050°F. The nominal strength of this steel treated as above is 175,000 psi. The test results are shown in fig. 7. They are very similar, as would be expected, to SAE 4140 and the same comments apply.

A wartime NE steel that was widely used was NE 8744. A number of test bars were made from this material with various surface finishes and fits. The copper-brazed test bars were normalized from 1650°F, oil quenched from 1525°F, and tempered at 1000°F. This material seems to braze fairly well. Fig. 8 indicates that the effect

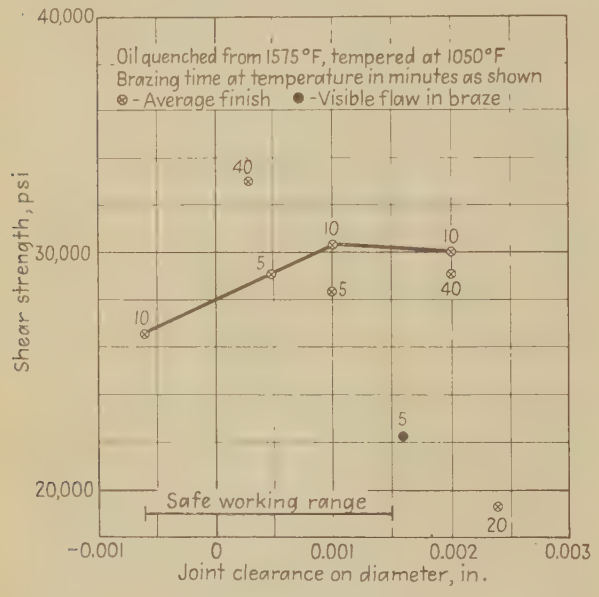



*FIG. 7 - Strength vs joint clearance, SAE 6150.*

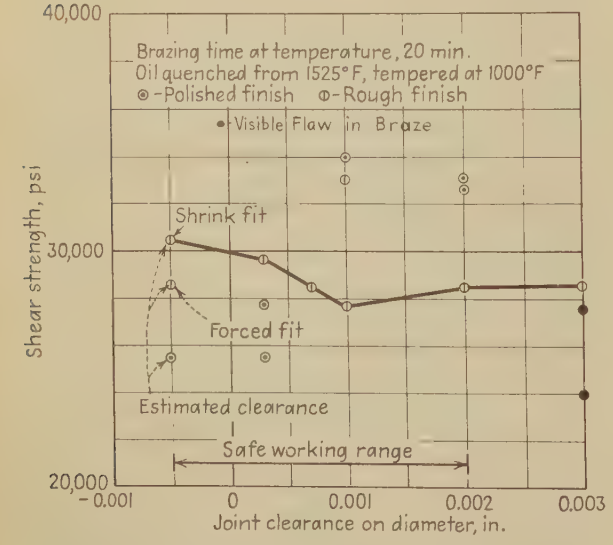



*FIG. 8 - Strength vs joint clearance, NE 8744.*

of fit and surface finish is small compared to the range of strengths. Design clearances up to 0.002 in. on diameter should be satisfactory. One of the bars with 0.0005 in. interference on diameter was shrunk in liquid air for assembly, the rest was forced at room temperature. That there was no appreciable difference in strength between them indicates that press fits do not impair strength.

Since the occasion might arise when two different materials must be brazed together, four combinations of materials were brazed and tested. Both SAE 2335 and 4140 were brazed to SAE 1040, SAE 1040 as female part in both cases, in sufficient numbers to plot clearance against strength, figs. 9 and 10. These copper-brazed pieces were normalized from 1650°F, oil quenched from 1575°F and tempered at 300°F.

In both cases the joint strength approached that obtained with SAE 1040 alone, shown in fig. 4. This presents the interesting possibility of using a thin, mild steel sleeve in, for example SAE 4140 joints, to obtain the increased strength shown when brazing these two different materials.

A more varied although less complete series of test results is shown in table 1. The individual clearances were not accurately measured, but were all between 0.003 in. and 0.004 in. on diameter. The general loss of strength due to the large clearance is most noticeable and most of the joints showed flaws, but the fact that these materials can be successfully brazed in various combinations with each other is obvious. Different sizes and shapes might, of course, give entirely different results.

When copper-brazed assemblies are to be heat treated, some thought should be accorded the relative size and position of the parts as well as their composition so as to avoid setting up destructive forces during quenching. Cases have been found where these forces, probably because of dimensional changes through the transformation range, have weakened or even completely broken the braze. Due to the variety of shapes and materials that can be used, no hard and fast rules can be set up.

Several experiments were performed in an effort to determine the source of these destructive forces. The following list shows what was

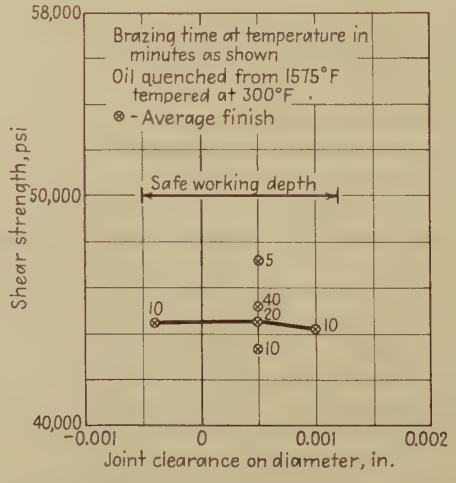



*FIG. 9 - Strength vs joint clearance, SAE 2335 brazed to SAE 1040.*

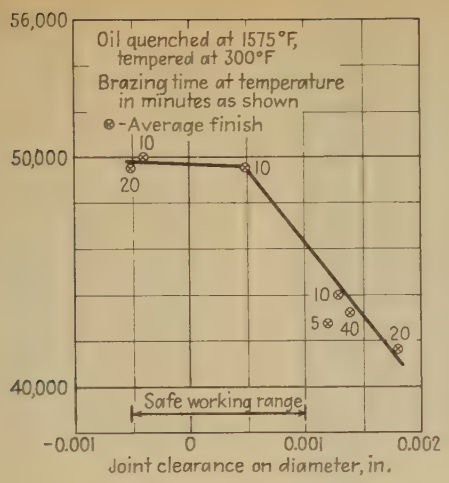



*FIG. 10 - Strength vs joint clearance, SAE 4140 brazed to SAE 1040.*

done and the result.

**A—An SAE 4340 steel bushing was brazed to SAE 4340 plate, as shown in fig. 11A. The bond was completely ruptured.**

**B—The SAE 4340 steel bushing in fig. 11A was brazed to SAE 1040 plate. The breaking strength was 85,000 psi.**

**C—The SAE 1040 steel bushing was brazed to SAE 1040 plate, as in fig. 11A. Breaking strength was 44,000 psi.**

**D—An SAE 4340 shaft was brazed to SAE 1020 plate, as in fig. 11B, with satisfactory results.**

Experiment A gave the clue to the explanation when it was found that the bushing had been reduced in diameter by 0.010 in. at the ends and 0.006 in. in the center. Aparently the thin walled bushing cooled more rapidly during the quench than the plate and, therefore, passed through its transformation range and expanded before a similar action had occurred in the plate. Since the plate was much stronger, the bushing was plastically compressed and later, when the plate transformed and expanded, the copper brazed joint was too weak to pull the bushing back to size, and rupture resulted. The transformation range for SAE 4340 steel on cooling occurs at a much lower temperature than most steels, which exaggerates the dimensional change during transformation as well as giving considerably more strength to the steel during the changes.

Experiment B gave a successful joint because the SAE 1040 steel plate has a high transformation temperature as compared to the SAE 4340 bushing. This fact, combined with the differences in mass of the two pieces, tended to cause the transformation to occur at the same time in both pieces, thus minimizing stresses.

Experiment C is similar to A except both parts were made of SAE 1040 steel instead of SAE 4340 steel. The same forces should be present but to a much smaller degree because of the higher transformation temperature. This was borne out by the strength figures which show much poorer strength than experiment B, but the damage was not as great as in experiment A.

Experiment D was the reverse situation having a thin plate around a heavy shaft. In this case, the SAE 1020 steel plate expanded quickly at a high temperature when the expansion is small and the parts more or less plastic. Later the SAE 4340 shaft also expanded putting a compression stress on the joint which it is well able to stand.

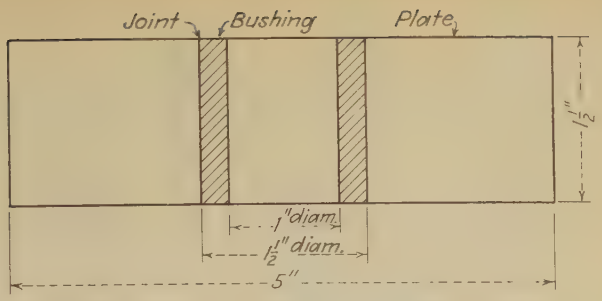



*FIG. 11A - Brazing setup to determine source of destructive forces of dimensional change of metals.*

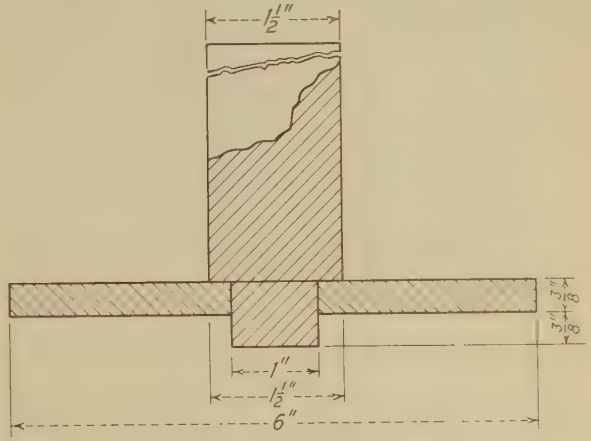



*FIG. 11B - Brazing setup to determine sources of destructive forces of dimensional change of metals.*

When heat treated parts are required to have a hard surface, attention must be given to the amount of surface decarburization caused during brazing. The figures in table II were obtained from the test bars used for the strength data previously covered. These figures stem from the use of wet hydrogen as a brazing atmosphere. If the hydrogen were dried, the decarburization would be reduced, and if dried to a dew point of —40°F most steels would show no appreciable decarburization. Commercial atmospheres for production furnaces are available which will not decarburize, those containing neither $H_2O$ nor $CO_2$. Decarburization is also somewhat reduced as the percentage of hydrogen is reduced, although drying is more effective. A thin copper or nickel plate over areas that must not lose

TABLE I

RESULTS OF COPPER BRAZING DIFFERENT MATERIALS

Brazing Temperature, 2050°F†

| Material, SAE No. Male Part | Material, SAE No. Female Part | Joint Strength in Shear, Psi | Heat Treatment Quench From, °F |
|---|---|---|---|
| 1040 | 4340 | 27,700 | 1500 |
| 4340 | 1040 | 21,600* | 1500 |
| 4140 | 4340 | 32,200 | 1525 |
| 4340 | 4140 | 29,800 | 1525 |
| 1040 | 4140 | 23,000* | 1550 |
| 4140 | 1040 | 34,000 | 1550 |
| 4340 | 4340 | 32,200 | 1500 |

* Low value due to incomplete braze.

† Joint clearance approximately 0.003 to 0.004 in. on diameter. All bars normalized from 1650°F before heat treatment. All bars oil quenched from temperature shown and tempered at 300°F.

*FIG. 12 - The creep of molten copper on various surfaces of machined test blocks after application of copper, is shown here. (1) Finish Ground; (2) Rough Ground; (3) Hand Filed; (4) Turned, Fine Feed, (5) End Milled, Fine Feed; (6) Shaped, Fine Feed.*

carbon is fairly effective. In general, it is advisable to use a furnace atmosphere that will not decarburize or, as a last resort, to leave extra material to be removed after brazing to eliminate any decarburized layer.

During production brazing, parts have been encountered that were poorly brazed because the copper did not flow properly to all parts of the joint. The obvious reason for some of these poor joints was the presence of a burr or sharp corner, which prevented free flow of the copper. The solution was to remove all burrs and chamfer all corners over which copper must flow. That this condition is vital was indicated by the fact that over 50 pct of the first lot of parts with burrs were rejected on inspection after brazing. An excellent yield was obtained after the burrs were removed.

On any part where this could occur it is best to apply the copper to only one side of the joint and use the presence of a fillet of copper on the other side as a criterion of a good braze. Other cases of poor joints were found where copper did not flow and where burrs were not present. Surface finish was suspected, and several SAE 1020 test blocks were made to prove the point. These blocks were 2 in. square with a small blind hole drilled in the center. The surface of each was finished differently. A fixed length of copper wire with more than enough volume to fill the hole was placed therein, and all blocks were placed in the brazing furnace for 30 min.

Fig. 12 shows flow over the various surfaces. There was little creep over either of the ground blocks (1 and 2) or the hand filed block (3). The greatest creep occurred on the fine and coarse feed turned blocks (4 and 9) and the heavy-cut shaped block (11). A deliberately improperly ground tool was used in these cases, giving a distinctly torn appearance to the tool marks. This is flow over open surfaces and not between two surfaces.

If all joints for copper brazing were perfect fits, the capillary action between even finely polished surfaces of easily wetted steels would rapidly draw the copper through the joint. In practice, however, most joints are sufficiently poor so that some roughness is of advantage and considerable roughness, such as straight knurling with lines running in direction of copper flow, helps make successful joints where tolerances have permitted considerable gap. In making deliberately rough surfaces, however, the roughness must not approach the burr stage.

As a result of numerous requests for information on the strength of copper-brazed joints at elevated temperature, a series of both lap-joint and butt-joint test bars were made as shown in fig . 13. . . . . For the lap-joint bar, the male part whose length was measured, was inserted to a depth of about ¼ in. into the female part. The plug was necessary to prevent failure in the threads during testing. After brazing, the copper fillet and enough of the female part were turned off to reduce the joint length to 0.100 in. The butt-joints bars were made by forcing two pieces, whose ends had been squared, into a ferrule until their ends were in close contact. After brazing, the ferrule was turned off, leaving a straight butt joint. After brazing and machining, all bars were normalized from 1650°F, brine quenched from 1525°F and tempered at 300°F.

TABLE II

DEPTH* OF DECARBURIZATION IN WET HYDROGEN AT 2050°F

| Material, SAE | Duration of Exposure to Temperature 5 min. | 10 min. | 20 min. | 40 min. |
|---|---|---|---|---|
| 1040 | 0.006 | 0.007 | 0.009 | 0.013 |
| 4140 | 0.005 | 0.010 | 0.012 | 0.013 |
| 6150 | nil | nil | nil | nil |
| 2335 | 0.004 | 0.006 | 0.007 | ..... |

* Decarburization depths were taken after heat treatment and no doubt some carbon removed during brazing was replaced by diffusion during heat treatment.

*FIG. 13 - Lap joint test, bar for elevated temperature test.*

The bars were tested at 300°F intervals up to 1500°F, with the results shown in figs. 14 and 15. The spread in results is not surprising since these bars were small and the tolerances in machining were wide. Although not measured, the joints probably ranged from 0.002 in. interference to 0.002 in. clearance. As can be seen from the curves, the loss in average strength up to 600°F is about 25 pct for either type joint. Above 600°F the strength falls off rather rapidly.

The discontinuity of direction in the curves between 300°F and 600°F has yet to be explained, although there is little question of its existence for either type of joint. At test temperatures of 600°F and above, there was evidence of yielding in the steel showing up as an actual measured reduction in area. This slight yielding of the steel may have relieved stress concentrations at the joint, accounting for the apparent lack of loss of strength from 300 to 600°F. An attempt to raise the room-temperature strength of a few lap joint bars, based on this discontinuity, by redrawing at 600°F actually gave a loss in strength as shown by the crosses plotted at the left in fig. 14. No attempt has been made to test copper-brazed joints under sustained load at elevated temperatures. Hence, the use of any of these short time results over probably 600°F should include a generous factor of safety or be backed up by an actual creep or stress-rupture test at the expected service temperature.

In summarizing the foregoing data, it would be well to point out that furnace copper brazing is an excellent means of joining steel parts together whether it be for single items or high production use. It is not, however, a standardized process and must be used properly to achieve success. Only general rules can be established and these are subject to modification for any particular case.

In general, any carbon or alloy steel parts can be brazed without flux provided they do not contain over 2 pct total of chromium, manganese, silicon, aluminum, and vanadium. Joints should be fairly tight, not over 0.001 in. clearance on diameter for most steels, and joint interfaces should not be too smooth. Joint strengths in shear range from 20,000 psi, to as high as 50,000 psi, after heat treatment; and about twice as much in tension depending mainly on material and joint clearance. Most copper-brazed parts can be heat treated after brazing without injury. In brazing assemblies to be heat treated subsequently where there are large differences in sizes between the parts, consideration must be given to stresses set up by transformations in the steel during quenching. If some thought is given to thermal expansion and transformation changes, dissimilar materials may be brazed together. If parts are to be heat treated and require a hard surface, an atmosphere that will not decarburize must be used. For elevated-temperature service, a strength loss from room temperature values of about 30 pct at 600°F must be provided for.


## Acknowledgments

F. C. Kelley, Research Laboratory, General Electric Co., Schenectady, N. Y.

H. M. Webber, Industrial Heating Divisions, General Electric Co., Schenectady, N. Y.


*FIG. 14 - Elevated temperature tests copper-brazed lap joints of SAE 1040, on test bar shown in fig. 13.*

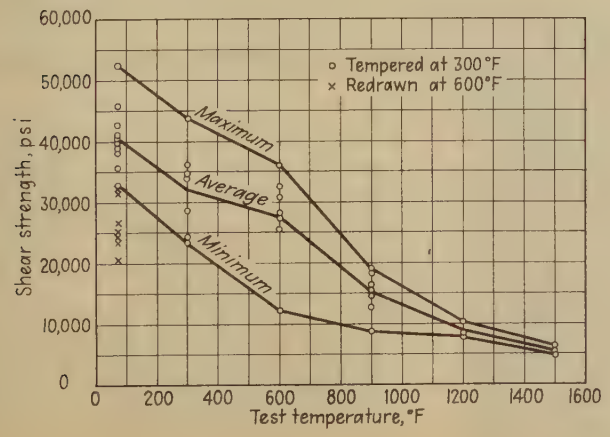
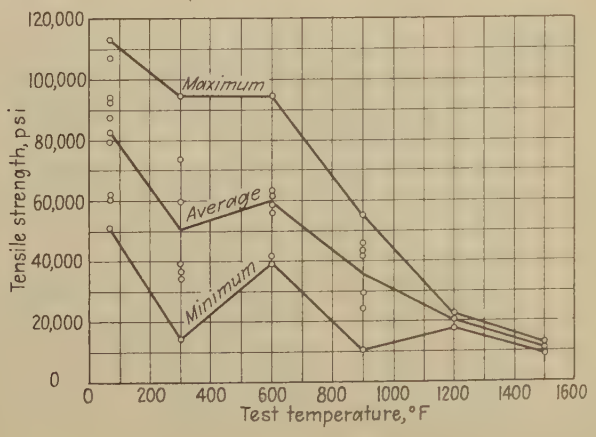



*FIG. 15 - Elevated temperature tests copper-brazed butt joints, SAE 1040 on test bar shown in fig 14.*



# New Refractories Plant Features Unusual Handling Methods

*ABOVE*

*FIG. 1 The new Baltimore plant of Harbison-Walker Refractories Co. The building at the extreme right is for raw material storage.*

*ABOVE*

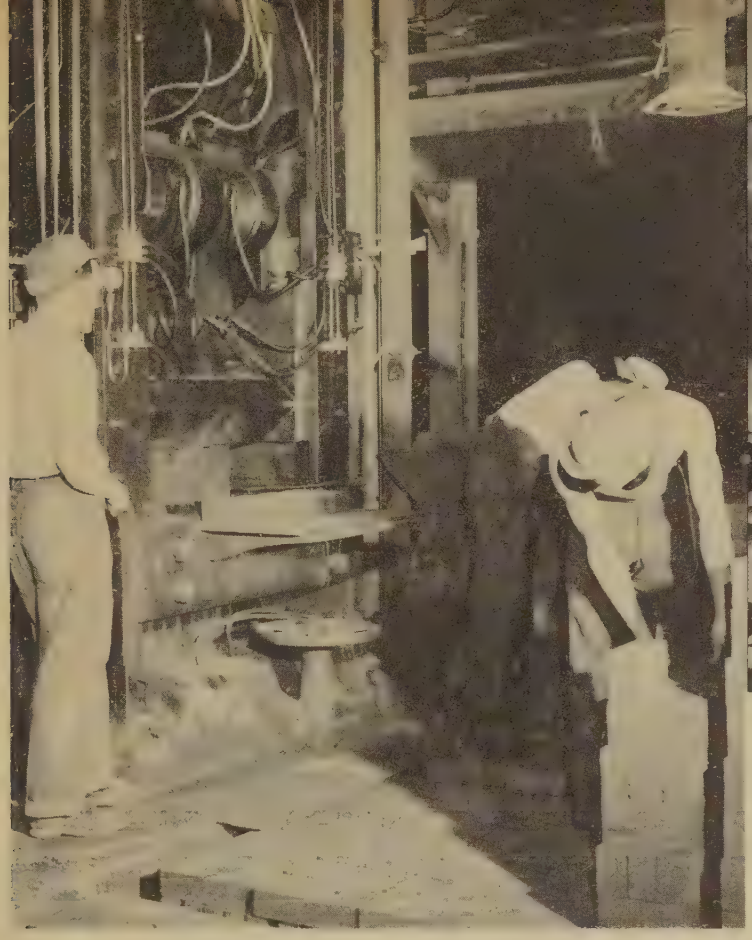
*FIG. 2 Raw materials are unloaded by vibratory car unloaders in the far shed and fed into primary and/or secondary crushers. From the crushers, the ore is carried by covered conveyers to the raw material storage building. Storing of crushed material only is said to lessen segregation of fines and lumps.*

*ABOVE*

*FIG. 3 A section of the raw material storage building. Each type of ore is kept in a separate bin to prevent contamination, and the building can handle 30 different types of raw materials. The bins are filled by an overhead conveyer directly from the crushers shown in fig. 2.*

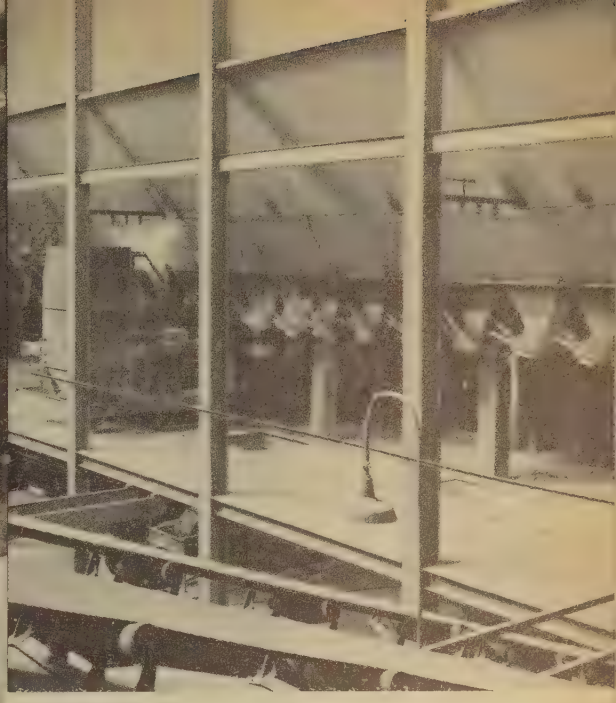
*LEFT*

*FIG. 4 After grinding to reduce ore to pieces ¼-in. diam or less, it is carried by conveyer to a series of triple screens shown here. From these screens, where the material is separated according to size, it is automatically conveyed to storage bins ready for batching.*



*ABOVE*

*FIG. 6 One of the presses used for pressing the brick is shown here. Bricks are loaded directly from the press onto kiln cars. From the presses, bricks go either to the drier or the high temperature kiln, depending on the type of brick involved. The driers are heated by the hot exhaust air from the high temperature kilns.*



*ABOVE*

*FIG. 5 All the 100 storage bins are equipped with bottom gates. Batches are made up by loading, from the gates, into a larry car which moves on tracks beneath the bins, as shown here. The larry cars are equipped with scales for accurate batching and each car has its own dust collecting equipment. Complete batches are dumped from the larry cars through floor openings into conveyers for transportation to mixers.*

THE new plant of Harbison-Walker Refractories Co. at Baltimore combines modern material handling techniques and comprehensive quality control methods for the production of basic refractories.

Designed and constructed by Harbison-Walker engineers, the plant location was selected with consideration for port facilities for receiving raw materials. The company is also building a new plant at Fulton, Mo., for producing fire clay and high alumina refractories.

The emphasis on quality control at the Baltimore plant is especially evident in this new plant in the arrangements made for separating the raw materials into numerous grain size classifications and in the care exercised in combining the sizes which will give the greatest density and spalling resistance in the refractory brick.

Another phase of the quality control program is reflected in the efforts to keep the raw materials—chrome ore, magnesite and olivine—separate to avoid contamination. Up until the final blending preparatory to mixing, all handling equipment is set up to provide separate flow lines for each of the three basic raw materials.

*FIG. 7 View of the Swindell-Dressler tunnel kiln in which all burned brick are fired. The kiln, 324 ft long, accommodates 32 kiln cars. Since the kiln, which is oil-fired, is expected to operate for long periods without shutdowns, it is being used as a means of testing various types of high duty refractories.*

***Desiring to retain the economy obtainable with acid electric furnace practice and at the same time gain the quality characteristics and flexibility associated with basic units, the National Supply Co. initiated a single slag basic melting practice. The technique followed in setting up an empirical melting procedure is outlined herein, with the authors stressing the four basic requirements that must be satisfied before the carbon-oxygen reaction can take place. Quantitative data are also presented, indicating the influence of various factors on melting conditions.***

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# Single Slag Basic Electric Furnace Practice

THE National Supply Co, Torrance, Calif., employs three electric melting furnaces normally charged with 6, 8 and 20 tons, respectively. Production from these furnaces includes standard carbon and alloy steel castings, standard carbon and alloy steel ingots and several analyses. Many of the requirements are for high quality steels to be used in aircraft and research projects.

In view of the very low phosphorus and sulfur limits on these special heats, it is advisable to follow a basic practice. Prior to the adoption of the single slag basic practice, it was customary to have the smallest furnace lined with acid refractories to produce steel for castings, but it was felt that an increase in flexibility could be attained if the smallest furnace was basic lined in which case smaller heats of the special steels could be conveniently produced. In order to approach the economy of acid operation for castings, a single slag basic practice was decided upon.

An experimental melting program was therefore initiated about a year ago to determine the advisability of this type of operation. A melting practice was to be developed that would give high quality steel and yet be within the scope of simple control procedures. The furnace used in the experiments is a three-phase furnace, with a 9 ft 2 in. shell diam and a 6-ton rated capacity. Power is supplied through 10 in. graphite electrodes by a 1500 kva transformer with four taps ranging from 100 to 239 v.

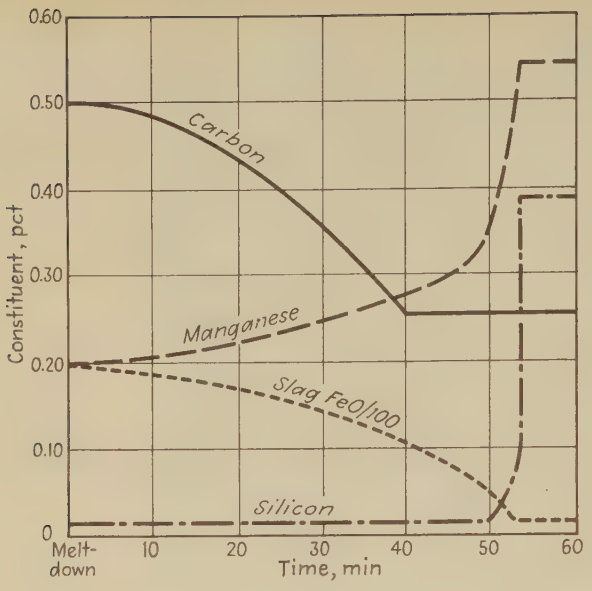
An empirical practice was developed in the laboratory which was based upon the carbon-oxygen reaction and the factors that govern it. Consideration was given to four basic conditions that must be satisfied before the carbon-oxygen reaction (or boil) can take place. These conditions, it is felt, are as follows:

(1) There must be sufficient carbon and oxygen present in the metal. This condition is not as simple as it appears, when considered from the standpoint of using the reaction to accomplish an important part of the cleaning up of a heat of steel. It is important to have the carbon and oxygen present in sufficient amount and in the proper proportion to give a sustained and vigorous reaction. A reaction will take place if there is a preponderance of carbon and a small amount of oxygen present; however, the reaction will be of neither useful duration nor vigor. The reverse is also true where the oxygen predominates the carbon.

(2) The metal must be reasonably free of elements that have a greater affinity for oxygen than carbon at the carbon-oxygen reaction temperature level. There may be several elements of this group present in the scrap, although they are generally present in such amounts, with the exception of silicon, that they may be disregarded.

(3) There must be a solid surface present upon which the bubbles of carbon monoxide can form. The furnace bottom supplies such a surface. This condition is the one that is most generally disregarded, and the obvious reason for the disregard is that the melter considers it a static condition, since the furnace bottom is always present. This reasoning is correct, but it must be remembered that solid surfaces other than that provided by the furnace bottom can be present. These surfaces can be supplied by a piece of scrap, a pig of iron or a chunk of ore.

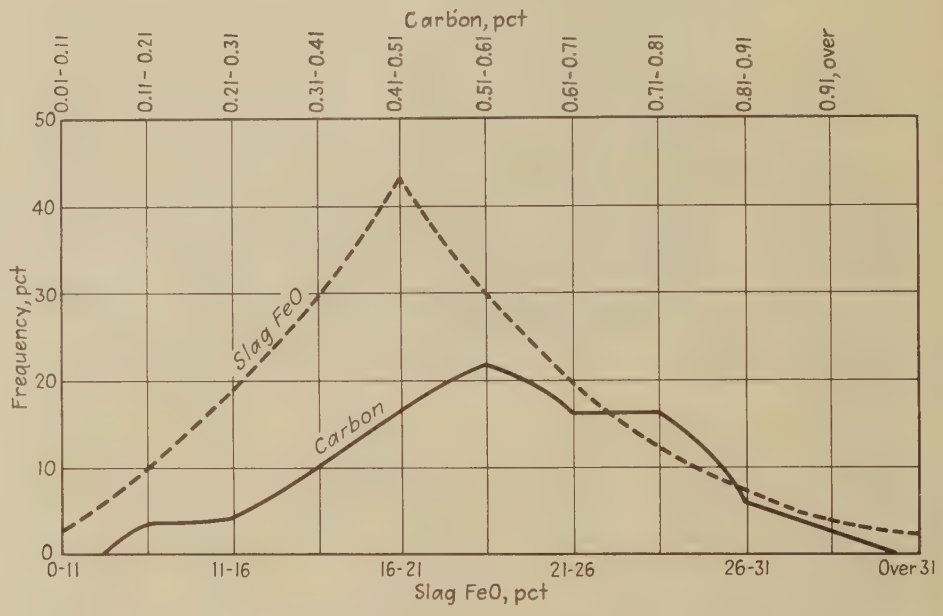
Recognizing that these latter surfaces are usually near the top of the bath, it can be seen that they are capable of touching off a reaction which is local in character. For example, assume that a heat has been melted under semi-oxidizing conditions and is carrying a slag with FeO content at about 12 pct. The heat gets hotter and hotter and the melter, obtaining no boiling action, decides that the heat is deficient in oxygen and adds some chunk ore. The usual occurrence




is an immediate reaction with flames shooting out of the furnace, the electrode mechanism clattering, and the slag frothing; and the melter is satisfied that he has promoted an excellent boil and has cleaned up his heat efficiently. This is often not the case. What the melter has actually done is add not only iron oxide to the furnace, but also several solid surfaces in the form of the chunks of ore, and since they have been added to the superheated zone of the bath, the violent response is nearly all a surface reaction. As the ore then dissolves and migrates through the bath and the entire bath reaches the required temperature level, a slower, even boil takes place, which the melter considers of secondary importance, but which is actually cleaning the heat better than the first violent reaction, since the carbon monoxide bubbles are forming on the bottom of the furnace and rising through the bath.

*ABOVE*

*FIG. 1 - Empirical curves representing ideal practice.*

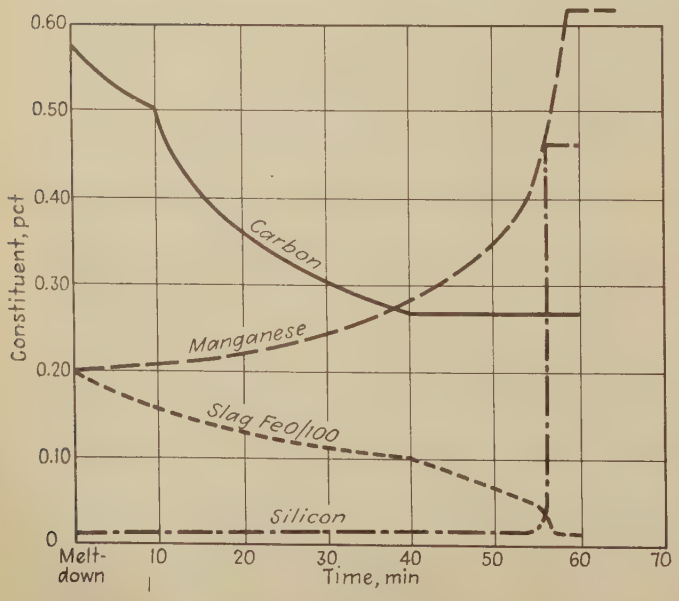



*RIGHT*

*FIG. 2 - Frequency curves for FeO and carbon taken at melt-down.*

*BELOW*

*FIG. 3 - Curve data taken on a heat that melted in properly. Curves closely follow the ideal heat (fig. 1).*




To best accomplish the purpose of the carbon-oxygen reaction it should start from the bottom of the furnace. This will be the case if sufficient carbon and oxygen are present in solution before the temperature reaches the reaction level and no foreign material is present to offer a surface upon which the bubble formation can start.

(4) The temperature of the metal must be high enough to promote the reaction. This temperature has been said to be 2900°F. Since the reaction is endothermic a continual input of heat is necessary to keep the reaction proceeding efficiently.

The basic chemistry of the reaction is: carbon + ferrous oxide — carbon monoxide gas + metallic iron.

There were several reasons for basing the practice on the carbon-oxygen reaction. It is the only practical method, to the authors' knowledge, of deoxidizing a heat of steel that will not form solid reaction products in the metal. This is important, especially from the standpoint

of reducing the total number of nonmetallics in the finished steel. The so called "scrubbing action" of the boil not only expedites the removal of solid oxidation products, but also reduces the hydrogen and nitrogen content of the bath. Particular stress should be placed on the hydrogen and nitrogen removal since at present this practice is used primarily in casting production. Reducing the content of these gases to a minimum tends to prevent the porous condition attributed to hydrogen and the formation of aluminum nitride inclusions, which may cause the so called "rock-candy" fracture.

It was felt that the practice to be developed must recognize these conditions and provide a means of creating and controlling them by practical methods.

In order to satisfy the first condition necessary for the carbon-oxygen reaction, it was essential that there be both carbon and oxygen present in solution in the metal. The decision was to charge these elements with the scrap. The aim was to be a minimum of 30 points of carbon above the top of the specification range, with an oxide content at melt-down sufficient to boil the 30 points of excess carbon out of the metal. Experience with other practices had indicated that this amount of carbon reduction aided in producing steel of good physical properties.

To fulfill the second requirement of the carbon-oxygen reaction, the removal of silicon from the charge, ore in addition to that amount necessary for the carbon-requirement was to be introduced with the scrap.

The furnace itself supplied the solid surface of the third requirement.

Considering the empirical practice substantially correct, it was next necessary to evolve simple control procedures to make the practice feasible and reproducible. Again the four conditions of the carbon-oxygen reaction were considered. In order to obtain the data necessary to establish these controls, several test heats of C-1025 steels were made under laboratory supervision, taking slag and metal samples continually for analysis. The information derived from these heats led to the drafting of a set of curves which was to represent the ideal practice, see fig. 1.

Realizing from the test heats that active control is virtually impossible while the heat is melting, the matter of how much ore and carbon to charge to accomplish their purposes was left to be determined experimentally. In view of this, it was decided to make melt-down the first control point.

Observation and chemical analysis had shown that the slag from this practice goes through a definite series of color changes and that these changes are largely dependent upon the FeO content of the slag. A slag containing over approximately 18 pct FeO is black, and as the FeO content drops below 18 pct, the color goes through a series of browns until the FeO reaches approximately 2.5 pct where the slag assumes a grey color. Although it is not usual, a white finishing slag is occasionally obtained with an FeO content of about 0.5 pct. It is apparent that by periodically observing the color of the slag and the fracture of a steel sample the progress of the heat can easily be followed.

When the heat was melted out, a metal sample

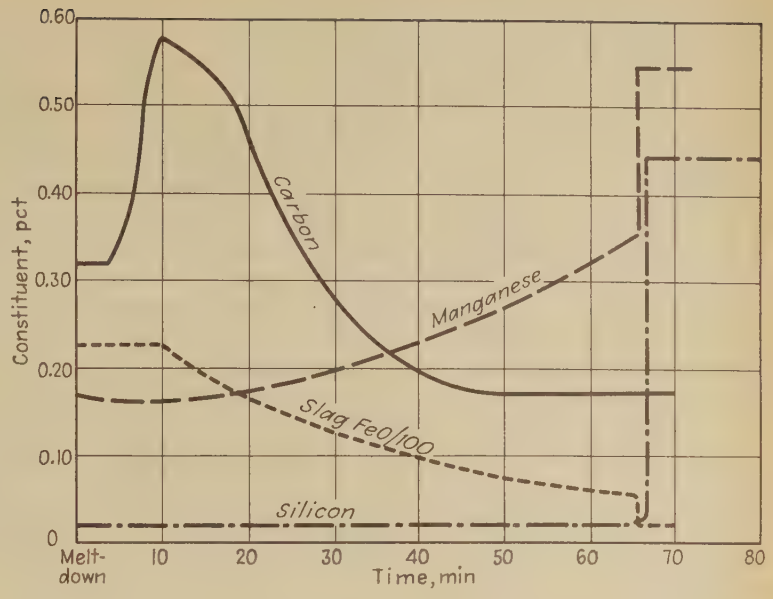
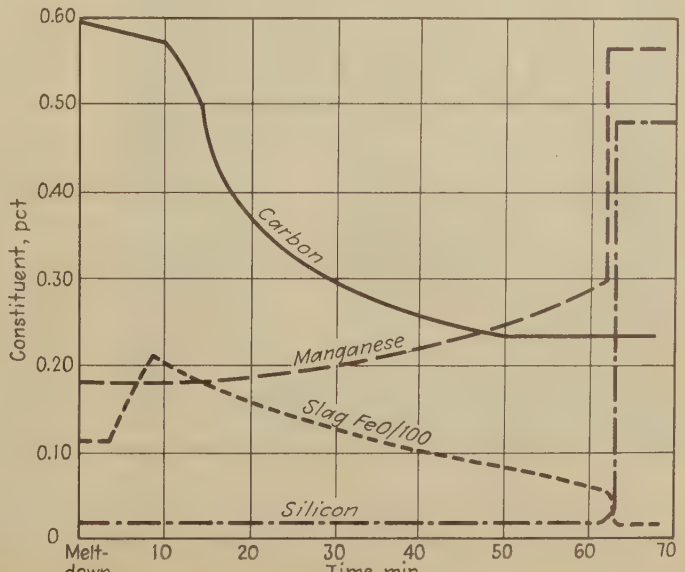



*FIG. 4 - Curve data taken on a heat that melted-in low in carbon.*

and a slag sample were to be taken. By observing the fracture of the metal sample and the color of a pulverized slag sample, the content of the metal and oxide content of the slag could be estimated. The fact that there is a relationship between FeO in the slag and FeO in the metal makes possible the use of the slag color as an indicator of the FeO in the metal. These tests would indicate at melt-down whether or not the carbon and oxygen requirements of the carbon-oxygen reaction would be fulfilled.

It was considered that the carbon-oxygen requirements would be fulfilled if the carbon was 30 points above the top of the carbon range and the slag contained approximately 20 pct FeO. If these conditions did not exist at melt-down, corrective additions should be made before the temperature reached the carbon-oxygen reaction level. If the carbon content was too low, the nec-

*FIG. 5 - Curve data taken on a heat that melted-in deficient in slag FeO.*



essary carbon was to be supplied by a pig iron addition. If the slag FeO was too low, an iron ore addition was to be made.

After necessary corrections were made, temperature was raised and the boil allowed to proceed.

The question of how far to allow the boil to progress was practically answered when experimentation showed that when the slag FeO was reduced to approximately 10 pct, further carbon elimination was improbable, and no more use of the carbon-oxygen reaction could be made.

This condition is not in disagreement with curves that have been published on the carbon-oxygen relationship in the metal.

When the slag FeO was reduced to approximately 10 pct, a preliminary specimen for carbon and manganese was to be sent to the laboratory.

The bath at this point would be relatively well deoxidized, however, it was felt that "fixing" the available oxide in the slag would offer two advantages; (1) the lower available oxide content of the slag would tend to promote a migration of FeO from the bath to the slag due to mass action, and (2) if the oxide in the slag were fixed there would be less loss of silicon at tap. An addition of fine silico-manganese to the slag was to accomplish these. Following the silico-manganese, a lime addition was to be made. The dilution of the slag with the lime would reduce the probability of reoxidization of the slag from the atmosphere.

It is not felt that the intention to deoxidize the heat without introducing solid reaction products is violated to any extent by making the silico-manganese addition. The majority of the alloy reacts with the slag and very little ever gets into the bath. Any of the addition that does find its way into the bath to react and form a solid deoxidation reaction product probably forms an inclusion material of the low melting point type and does not affect the physical properties to any measurable extent. On the other hand by rapidly reducing the oxide content of the slag, conditions are established that will allow bath deoxidation to go more nearly to completion.

When the carbon and manganese preliminary analyses were returned, final adjustments were to be made, if necessary, and the heat tapped.

Melt-down FeO and carbon samples were taken on every heat to take advantage of the data as a control medium and also to determine how consistently a heat would melt-in with the proper carbon-FeO balance when these elements were added to the charge in what was assumed to be the proper proportions.

Fig. 2 shows frequency curves for both FeO and carbon taken at melt-down. It can be seen that the peak of the carbon curve is between 0.51 and 0.61 pct; that of the slag FeO is between 16 and 21 pct. This indicates that a good percentage of the heats need no correction at melt-down. Those heats that are on the high and low sides of the peak are corrected immediately after they are recognized as such, and the slag control procedure herein described provides a dependable correction with the result that practically all of the heats continue from this point under similar conditions. Figs. 3, 4, 5 and 6 show graphically the effect of the controls on the various elements.

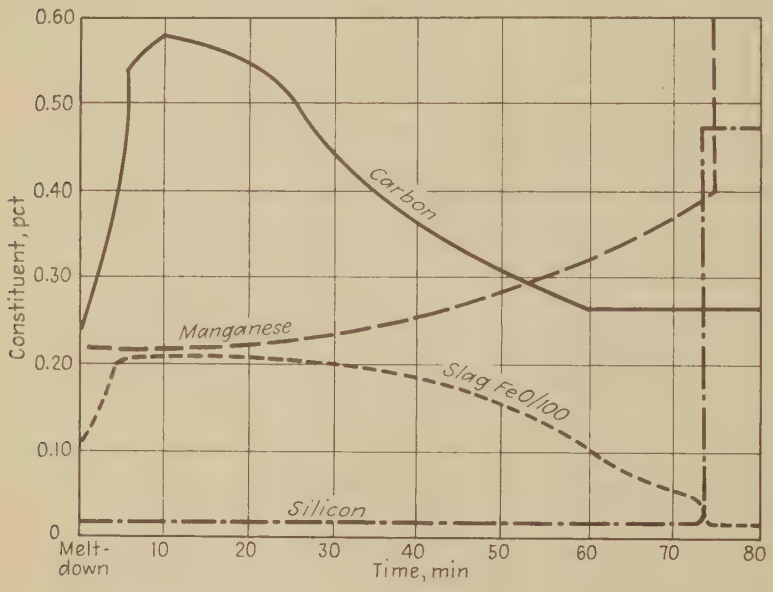



*FIG. 6 - Curve data taken on a heat that melted low in both carbon and slag FeO.*

Fig. 3 shows a heat that melted in properly. It will be noted that these curves closely follow the ideal heat (see fig. 1).

A heat that melted-in low in carbon is shown in fig. 4. The melter made a pig iron addition 3 min after melt-down to raise the carbon to the required 0.30 pct excess, and then increased the temperature to start the boil.

In fig. 5 the heat melted-in deficient in slag FeO. An ore addition was made following the melt-down slag test to provide the oxide content necessary for the carbon-oxygen reaction.

The heat represented by fig. 6 melted low in both carbon and slag FeO, which necessitated both an ore and a pig iron addition to establish the proper carbon-oxygen relationship.

A summary of the operating practice can be presented as follows:

(1) Melt under fully oxidizing conditions to remove silicon and have a sufficient excess of oxide present to sustain an efficient boil.

(2) Aim for a carbon content at melt-down of approximately 30 points above the top of the specification range.

(3) Aim for a slag FeO content of approximately 20 pct at melt-down.

(4) Induce the boil to begin as soon after melt-down as possible by melting-in hot.

(5) Make the boil proceed until the slag FeO is reduced to a maximum of 10 pct and the carbon content is within the specification range.

(6) Send a laboratory preliminary for carbon and manganese.

(7) Make a silico-manganese, and a lime addition to the slag.

(8) Make any final adjustments of chemistry that are necessary, based on preliminary, and the silicon and tap.

These eight steps are a guide for a melter using this practice. The only additional knowledge, other than that which all melters use in any practice, is that of slag colors. Recognizing the slag FeO content from properly prepared samples is not difficult to learn when a series of standards is prepared.

Physical test results are considered by many to be the criteria with which to evaluate a melting practice. At National Supply Co., casting steels are rated on the basis of a quality factor. This factor is determined from the formula:

$$\frac{\dfrac{\text{Ultimate Strength}}{1000} - 6\,\text{Red. Area}}{5}$$

The SAE specification for 1025 steel demands a quality factor of 54; the average quality factor for 1025 steel made by the single slag practice described is 71. A heat of 1025 steel in the annealed condition gives an ultimate strength of around 75,000 psi, a yield point of around 40,000 psi, an elongation of about 28 pct, and a reduction of area of about 48 pct. Table I shows the physical properties of ten consecutive 1025 heats. All bars were in the annealed condition.

TABLE I

Physical Properties of Ten Consecutive Heats of 1025 Steel Made by Single Slag Practice

| Ult. Strength, Psi | Yield Point, Psi | El., Pct | Red. Area Pct | Quality Factor |
|---|---|---|---|---|
| 76,884 | 47,928 | 28.0 | 81.0 | 76.6 |
| 80,379 | 48,427 | 25.5 | 44.0 | 68.9 |
| 77,383 | 48,926 | 26.5 | 46.0 | 70.7 |
| 72,391 | 45,931 | 29.5 | 50.9 | 87.6 |
| 82,875 | 51,123 | 25.2 | 43.9 | 69.2 |
| 75,386 | 45,900 | 28.5 | 46.3 | 70.6 |
| 77,693 | 51,628 | 28.0 | 50.0 | 75.6 |
| 81,877 | 49,925 | 25.3 | 43.4 | 68.5 |
| 81,878 | 50,923 | 23.0 | 46.9 | 72.7 |
| 75,700 | 48,600 | 28.0 | 48.0 | 76.7 |

It is common knowledge that, due to uncontrollable conditions that occur during the melting of a heat, considerable variation of the chemistry of the slag and metal may exist. These variations may, if not corrected immediately, influence the properties of the final steel. The practice described provides a means of quickly measuring the variations and returning them to a standard before the temperature level is high enough for the carbon-oxygen reaction to take place. Standardization of the heats at melt-down, it has been found, results in uniform properties from heat to heat. It is felt that this fact alone is sufficient reason for following this practice. In addition, the method is fast and, therefore economical, and produces steel which has been found by actual comparison to be superior in properties to that made by other methods.

# Full Automatic Bloom Scarfer at J & L

A FULLY automatic flame scarfing machine which completely skins four sides of 7x8½-in. blooms 60 ft in length in less than a minute at a controlled speed of 130 fpm has recently been installed at the Pittsburgh Works of Jones & Laughlin Steel Corp. The unit is the new model CM-29 scarfing machine built by Linde Air Products Co. The cycle of operation for removing light scabs and seams is automatically controlled through positioning of the bloom in the machine, beginning flame cutting and through to the discharge of the desurfaced bloom.

The bloom is positioned to its starting point in the machine by a series of electric eyes. Surface metal is heated with oxygen and acetylene to kindling temperature between two 6-nozzle and two 7-nozzle heads, at which point dry oxygen is turned on and the operation progresses at controlled speed. Head and nozzle arrangement on this machine has been designed to allow fast replacement of cutting tips. It is said a nozzle or entire bank of nozzles can be changed in less than 10 min.

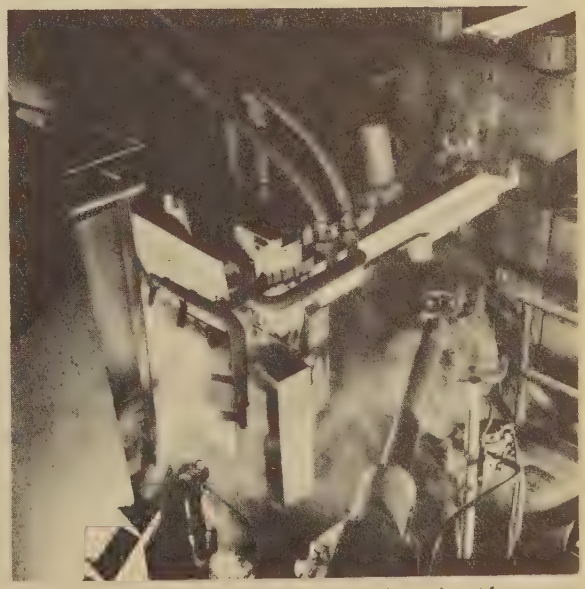


*FIG. 1 - Desurfacing operation in the new Linde fully automatic scarfing unit recently installed by J.L. The bloom moves from left moves from left to right in this view.*

# Regeneration System

By EDWIN D. MARTIN
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*Chicago*

ONE of the advantages of a pickling bath which permits a high pickling rate independent of the iron sulfate content is that such a bath may be loaded almost to saturation with ferrous sulfate while pickling at high speeds. This type of a solution would be ideal for any system which could regenerate the acid bath and return it to the pickling tanks for reuse by removing the ferrous sulfate. Such a system of regeneration obviates the necessity of dumping baths of high acid content as they approach saturation with iron sulfate.

Since it had been observed that it was ferrous sulfate monohydrate which separates from such baths and since a suggestion had been found in the literature[1] of the possibility of an inverse solubility curve for ferrous sulfate at the higher acidities and temperatures, Inland Steel Co., Chicago proceeded to investigate the factors involved and finally developed a regeneration system of great practical value.

Inland's technical staff had already done considerable work in this field, and in addition an extensive survey of the proposals made in the past for solution of the problem was made. The technical and patent literature was found to be rich with proposals for the treatment of waste pickle liquors, especially since stream and lake pollution has become of increasing seriousness. But, in spite of widespread attention and voluminous reports, little of practical value to the iron and steel industry had been developed. A few references,[1 2 3 4] in which many proposals are reviewed, will serve as keys for those wishing to delve into this subject.

Briefly, the many proposed processes can be grouped into the following classes:

1. Processes for the recovery of ferrous sulfate heptahydrate (copperas) and sulfuric acid either by refrigeration or by evaporation.
2. Processes for the recovery of ferrous sulfate monohydrate and sulfuric acid, starting from the iron sulfate heptahydrate.
3. Processes for recovery of ferrous sulfate monohydrate by application of pressure.
4. Processes for recovery of sulfuric acid and iron oxide as final products from the heptahydrate as intermediate product.
5. Processes yielding iron oxide pigment as the final product without acid recovery.
6. Processes for the recovery of ferric sulfate and sulfuric acid.
7. Electrolytic processes for production of iron and sulfuric acid.
8. Processes using waste pickle liquor for making ammonium sulfate from the ammonia recovered from coke oven gas.
9. Processes employing lime, dolomite or magnesia for neutralization.
10. Miscellaneous processes of various types not classified above.

None of these proposed methods for the treatment of waste pickle liquor seemed well adapted to the regeneration of the acid from the used high speed pickling bath containing 16 to 18 pct by volume of acid and ferrous sulfate equivalent to 65 to 70 g per liter as Fe. Therefore, Inland started a comprehensive investigation.

# for Pickle Liquor

***A wide variety of systems, using many processes, have been proposed for the treatment and regeneration of waste pickle liquors. This article describes the research done at Inland Steel Co. toward the development of a pickle liquor regeneration system for a continuous strip pickling line and gives details of the flexible and economically sound process, based on the comparatively low solubility of ferrous sulfate at high acidity and temperature, which was developed.***

### Effect of Acidity on Solubility

It was found, as suggested in the literature,[1] that the solubility of the ferrous sulfate monohydrate does decrease with increase in acidity and temperature in the ranges studied. As may be seen by referring to fig. 1 in the temperature range of 180° to 210° F, the relationship between the solubility and acidity is linear from 16 pct by volume of sulfuric acid to 24 pct by volume. At 220°F this relationship appears to be mathematically an equation of the exponential type which may be expressed as follows:

$$Y = ae^{bx}$$ where

x = solubility of the ferrous sulfate monohydrate in terms of equivalent grams per liter of $Fe^{++}$.

Y = concentration of sulfuric acid.

a, b = constants.

In general the solubility of the monohydrate decreases with increase in temperature from 180° to 225°F. However, the decrease in solubility is not great. As noted from fig. 1, the solubility only decreases 10 g per liter of equivalent Fe with a temperature rise from 190° to 220°F in an 18 pct by volume solution.

To find out how rapidly ferrous sulfate monohydrate will precipitate from supersaturated solutions of various acid concentrations, a series of experiments were performed. Some of the results are given in fig. 2. Here the ferrous sulfate (as equivalent Fe) remaining in solution is given as a function of time to indicate the rate of precipitation of the monohydrate. Increasing acidity increases the rate and completeness of the precipitation during the first 3 hr. Other tests indicated that at 32 pct by volume acid concentration and at 220°F, precipitation of ferrous sulfate monohydrate from a solution containing 56 g per liter of equivalent Fe was complete to the solubility limit of 16 g per liter of equivalent Fe in 20 min. Starting precipitation by quickly raising the acid concentration to 32 pct by volume in a solution containing higher concentrations of ferrous sulfate further shortens the time to complete precipitation to the solubility limit.

*This article is an extensive abstract of a section of the paper "Continuous Strip Pickling," presented at the General Meeting of the American Iron & Steel Institute, New York, May 27, 1948.—Ed.*

### Basis of Acid Bath Regeneration System

It was evident from this experimental work that ferrous sulfate can be removed quantitatively as the monohydrate to a low concentration in a high speed pickling bath containing 16 to 18 pct by volume sulfuric acid and nearly saturated with iron sulfate. If the acidity and temperature of the regenerated solution are adjusted, it may be reused for pickling until again loaded nearly to saturation.

Any such regeneration system must remove as much iron sulfate from the solution as is brought into the pickling bath by pickling of the steel.

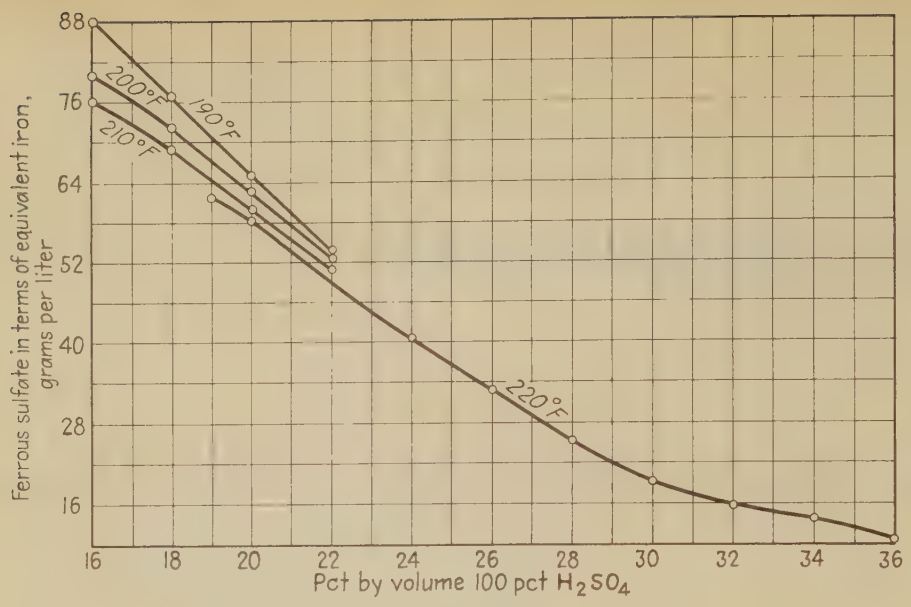



*FIG. 1 - Effect of acidity and temperature on the inverse solubility of ferrous sulfate in sulfuric acid solutions.*

From the experimental studies it was evident that raising the temperature lowers the solubility limit somewhat but that increase of acidity is a more powerful factor. Acidity can be raised by adding sufficient acid to the spent solution to raise it to the level of acidity required in the regenerated solution for use in pickling. Since volume of solution returned to the pickling lines must be in direct proportion to the volume withdrawn, this can be done without difficulty. Acidity can be further increased by evaporation in the regeneration system. This has an added advantage, as explained later, in that it permits the recovery of acid and iron sulfate from dragout solution and rinse waters. The combination of reducing the solubility limit in a spent solution, well loaded with iron sulfate, by raising the temperature, adding fresh acid and concentrating by evaporation to a higher acidity is very effective in removing the ferrous sulfate as the monohydrate by rapid precipitation. As an example, spent solutions containing some 67 to 72 g per liter equivalent Fe may be regenerated to full acid strength and 14 to 18 g per liter of equivalent Fe.

Further studies yielded facts which permit the following conclusions:

(1) The ferrous sulfate monohydrate can be precipitated rapidly in a crystalline form of high settling rate.
(2) The high settling rate makes it possible to filter a slurry, whose volume is only a small part of the total volume of the solution from which the salt is precipitated.
(3) Filtering can be accomplished in centrifuges or rotary vacuum filters.
(4) The salt can be washed with cold water, and the wash water sent to a makeup tank to take the place of part of the water lost in the preceding evaporation step.
(5) By counter-current rinsing with hot water at the end of the pickling line, using recirculating trough-rinse sprays, the volume of the rinse water can be kept down.
(6) Since the monohydrate is readily soluble in hot water, hot rinsing does a quality job.
(7) Because only hot water is used in rinsing, the steel does not have to be cooled and again heated to dry as is the case with present practices.

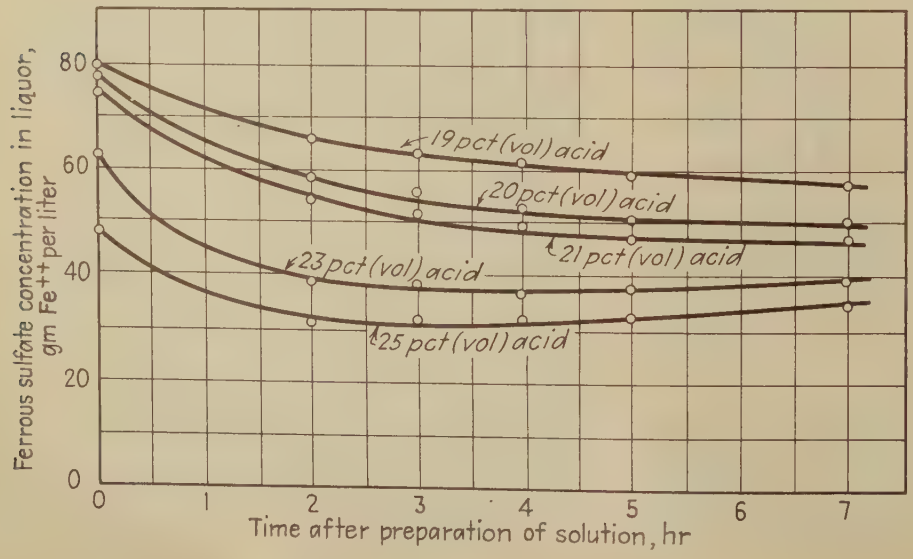



*FIG. 2 - Effect of time and acid concentration on the precipitation of ferrous sulfate from saturated solutions.*

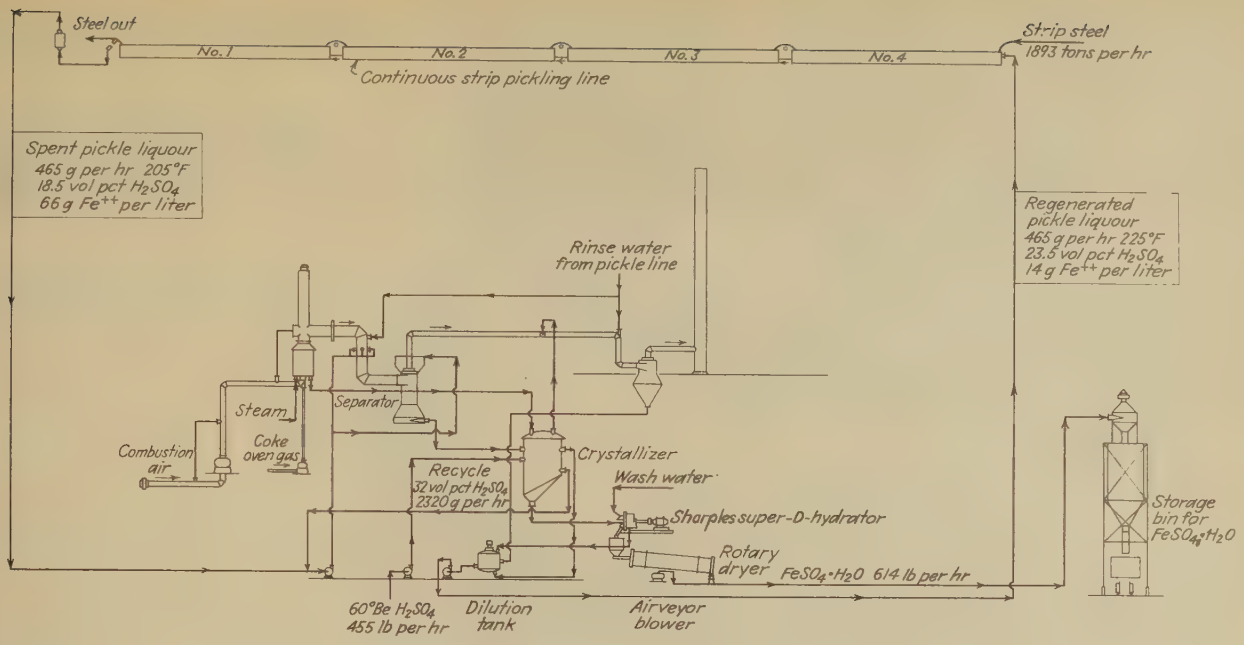



*FIG. 3 - Flow diagram of a proposed system for carrying out the acid regeneration method developed by Inland Steel Co.*

(8) The rinse water can be reused in the regeneration plant to remove acid entrained in gases, and then added to the makeup solution for pickling. This avoids pollution and waste of acid and salt.

(9) Evaporation can be accomplished cheaply with heated gases obtained by combusting coke oven gas.

(10) The solutions are maintained at high temperatures throughout. It is not necessary to refrigerate and again heat the solution to pickling temperatures as required by regenerating systems which precipitate the heptahydrate by refrigeration cooling.

(11) Since lowering of temperature raises the solubility of the monohydrate, precipitation in pipe lines is automatically avoided if the temperature is not allowed to drop too far.

(12) The monohydrate salt is free-running when dried and of a fine crystalline nature which permits easy pouring and air conveyance. It is the stable form of iron sulfate at room temperature and will not take on moisture from the air. It remains stable on heating to about 300°C. Ferrous sulfate monohydrate ($FeSO_4 \cdot H_2O$) weighs only 62.5 pct as much as copperas ($FeSO_4 \cdot 7H_2O$) for the same ferrous sulfate content. It can be transported at lower cost per unit weight and there is less water to drive off in those uses which require roasting.

## Proposed Regeneration System

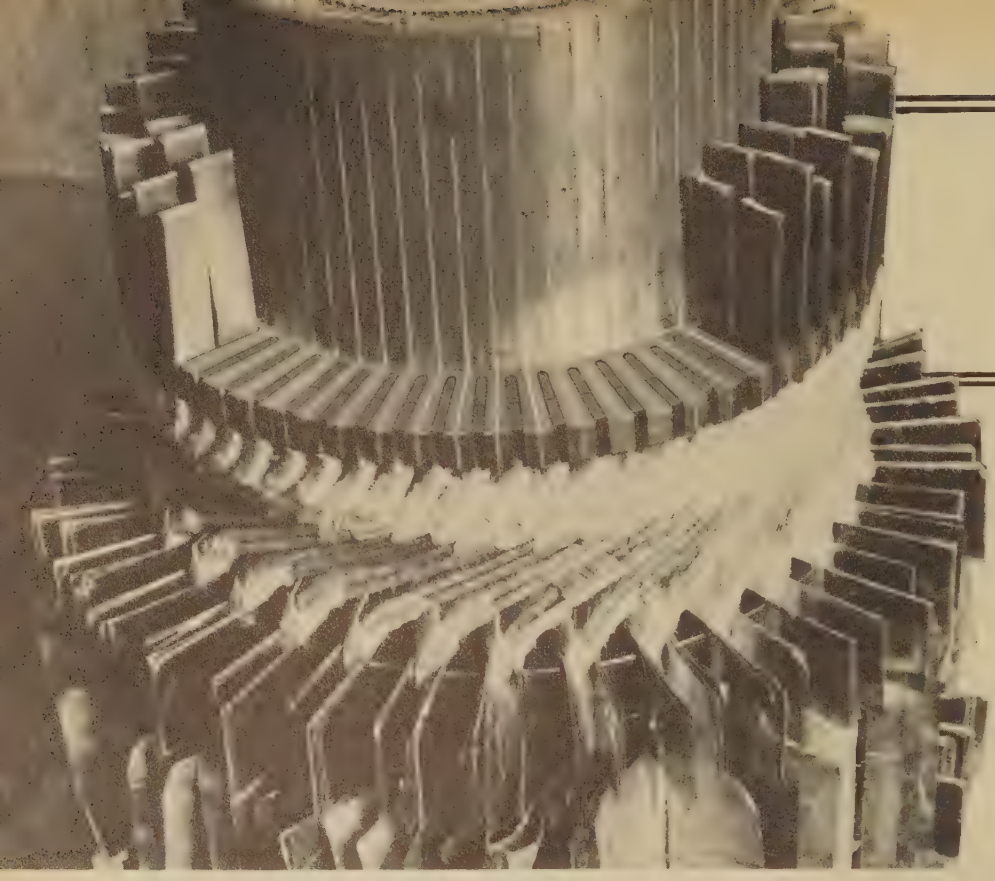
A recovery or regeneration plant was designed based on calculated optimum conditions of the proposed system.

A flow diagram of the process developed is given in fig. 3. The spent pickling solutions, containing 18.5 pct (volume) $H_2SO_4$ and ferrous sulfate equivalent to 66 g per liter of Fe, are pumped from the final pickling tanks of the three lines through a common surge tank to the evaporator. It is combined with approximately five times its volume of recycle liquor from the crystallizer and introduced through spray nozzles into the stream of hot combustion gases from a Petro-Chem furnace. These hot gases at 2000°F affect the flash evaporation of water from the solution and are cooled to a temperature of 215°F. The recycle liquor acts as a crystal seeding agent for the spent liquor. The concentrated spent liquor is removed from the gases by a centrifugal separator and drains to the crystallizer. The gases, after leaving the separator, are washed and cooled by the rinse water from the pickling lines to recover any acid going out with the gases.

The concentrated liquor in the crystallizer is heated to a temperature of 220°F by direct contact with superheated steam generated in the Petro-Chem furnace. Fresh acid (60° Be $H_2SO_4$) is added to the concentrated liquor in the crystallizer to replace that lost in the pickling operation. This brings the acid concentration in the crystallizer up to about 32 pct by volume. At the elevated temperature and high acid concentration, ferrous sulfate monohydrate crystallizes from the solution. The suspension of salt passes down around a baffle from the feed section of the crystallizer to the main volume of liquor. After being in intimate contact with suspended crystals for 2 hr, the complete crystallization occurred. After settling has occurred the clear supernatent acid solution of 32 pct by volume is drawn off and is sent to the dilution tank. A portion of the slurry is recycled to the evaporator. The heavy slurry is drawn off the bottom of the crystallizer and fed to the centrifuges. The crystals, after washing, are discharged to an air conveyer which affects the final drying.

The filtrate from the centrifuge is discharged to the dilution tank. The concentrated acid solutions in this tank are diluted to the desired strength by the addition of the wash and rinse waters. The diluted regenerated acid solution containing 23.5 pct $H_2SO_4$ and ferrous sulfate equivalent to 14 g per liter Fe is then pumped back to the pickling lines for reuse. The actual value of the acidity of this return regenerated

*(Continued on page 66)*



# Welding

*FIG. 1 - Rectangular wires are assembled in commutator neck slots, and the projecting ends are cut off flush with the risers. In welding, the two riser segments and the two leads are fused together.*

***Using a special, water-cooled fixture, wires and risers in electric motor commutators are welded at a high rate. The technique, which employs non-consumable carbon electrodes, and fixture are described in this article.***

BY means of a special water-cooled fixture, wire and riser connections in electric motor armatures are being welded instead of soldered. Standard, non-consumable carbon electrodes are used, and the connections are welded manually. As many as 65 separate, closely spaced leads in one of the motor designs can be welded in 17 min, according to Elwell-Parker Electric Co., Cleveland, where the technique was developed and is being used.

The fixture in which the armature is held is a simple, easily adjustable shop-made device. Copper wires and risers are fused together under a flow of water, which localizes heat application and protects adjacent areas. Connections are uniformly sound with smooth surfaces that require practically no finishing.

The welder works to close tolerance at each contact point, yet few rejects result from misplaced metal causing shorts. The method yields stronger connections and armatures far less liable to damage from overheating in severe service than soldered connections.

Elwell-Parker builds the motors and controllers which it installs in its industrial trucks. Tremendous overloads to which truck motors are subjected sometimes melts solder, and as the armature rotates the solder is dislodged, destroying contacts and making a motor inoperable.

In standard type lift trucks such as the fork and crane types there may be as many as four motors; one for propulsion, another for operating the steering mechanism or revolving unit, a third for the lifting device and a fourth for the tilt or boom. Trucks so equipped are used for heavy handling jobs, but the motors in the

# Copper Motor Connections

By W. A. LLOYD
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*The Iron Age*

trucks which continually perform the hardest service seldom are more than 5 hp.

At the Elwell-Parker plant, the armature-core and commutator, on a demountable shaft, are placed on a wooden support in accordance with customary assembly procedure. No change in size or shape of any part has been necessary in order to provide for welding.

Commutators are manufactured from assembled segments. In a motor rated at 5 hp, the diameter of the face is approximately 4¾ in., and the width is 4 in. Each bar-segment extends beyond the face and terminates in a riser to engage the copper wires in forming the coil. The risers appear as fins, as they are spaced so that they form a series of slots that are 3/32 in. wide and ⅞ in. deep. Ends of the copper wires forming the coil are fitted into these slots, and it is here where the welding is done.

The wires are rectangular in cross-section, approximately 3/32x⅜ in., as shown in fig. 1. A bottom lead and a top lead, one directly above the other, are placed in each slot. It is a friction fit and when leads are tapped down they are in

*FIG. 2 - The preformed copper wires are rectangular in cross-section, and insulated with asbestos. These, for a 5 hp motor, are about 3/32 X 3/8 in. Wires for small motors are usually round and insulated with either asbestos or Fiberglass.*

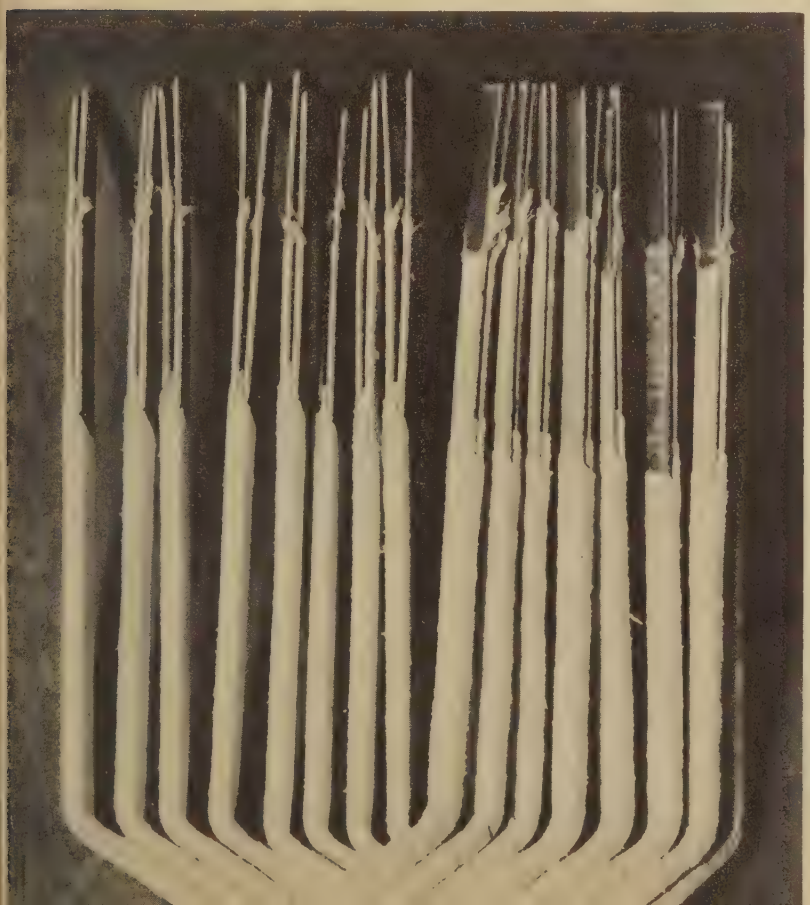


*FIG. 3 - This adjustable fixture holds the commutator vertically and permits the welder to rotate it as he works. Water coolant is carried to the commutator head during welding through the rubber hose.*

*FIG. 4 - The wires and risers of the commutator are welded together under water, the fixture enabling an experienced welder to make as many as 65 welds in a commutator in 17 min.*

tight contact with each other and with the sides of the riser slots.

Wire leads are insulated with asbestos for the heavier sizes and Fiberglas for the lighter, right up to the ends that fit in the slots. They are preformed to a U-shape, as shown in fig. 2, requiring a minimum of bending and fitting when being assembled in the armature. Bare ends are purposely left longer than required and extend out from the slots. After all are in place, the ends are cut off flush with the risers. After the armature is banded, the commutator and coil ends are then ready for welding.

Riser segments are insulated with sheet mica, and the welder must not permit the copper, when fluid, to flow across the mica. This would short circuit the motor. The area of fusion must be kept about 9/32 in. wide and ¾ in. long. It is to prevent the copper from spreading to areas where it is not wanted that welding is done under water.

The fixture shown in fig. 3 holds the armature vertically for welding and has a pipe support with two adjustable arms extending horizontally. The armature shaft is pivoted between these supports, the top arm being provided with a pointed screw to turn down after the shaft is in place.

The water supply for cooling the armature is brought to the upper part of the fixture through a ½-in. rubber hose, attached so the outlet is about 12 in. above the work, out of range of the welder's vision. The welder regulates the flow of water to obtain a steady, smooth stream. Below the fixture is a pan to catch water that flows from the work, and a pipe leading to a drain. An experienced welder can weld about 65 connections in 17 min, as shown in fig. 4, using a non-consumable electrode.

The risers are machined but the completed welds are relatively smooth and do not require subsequent finishing. The weld is quite different in many respects from that which is made when metal is deposited from a welding rod.

# Regeneration System For Pickle Liquor

*(Continued from page 63)*

solution will depend on the quantity of solution withdrawn from each line per unit of time. This quantity is in turn determined by overall economic factors.

Quantities of materials, utility requirements and flow rates are given in fig. 3 and in table I. These figures are based on pickling typical steel strip (48 x 0.095 in.) at a rate of 10,000 tons per month, operating 22 24-hr days per month.

TABLE I

Utility and Materials Requirements for Acid Regeneration System.

| | units | per hr | per month |
|---|---|---|---|
| Steam | lb | 195 | 103,000 |
| Service water | gal | 151 | 79,500 |
| Rinse water | gal | 96 | 50,800 |
| Power | kw-hr | 37.5 | 1980 |
| Coke oven gas (550 Btu) | cu ft | 2710 | 143,100 |
| Acid (60° Be $H_2SO_4$) | lb | 455 | 240,000 |
| Product Rate ($FeSO_4 . H_2O$) | lb | 614 | 325,000 |

The proposed pickling system would consist of the continuous pickling lines with a recovery or regeneration plant. The treated solution from the recovery plant is pumped to the first tank of each pickling line. The flow of the solution is concurrent with the travel of the strip from one tank to another. It is then pumped from the last pickling tank to the regeneration plant. The temperature in No. 1 tank is maintained at 205°F while in the other tanks the temperature is decreased from 200°F to 190° F successively so as to raise the solubility limit for ferrous sulfate. There is a decrease in acidity and increase in iron sulfate content in each successive tank. No additions of acid are made to these tanks since the acid added in the recovery plant is equivalent to the acid decrease during pickling. Dragout loss of the acid is practically eliminated by the use of all rinse water in the recovery system.

## References


[1] Heinrich, F.; Stahl & Eisen 58, 617 (1938).
[2] Heinrich, F.; Stahl & Eisen 57, 752 (1937).
[3] Sierp, F.; Stahl & Eisen 58, 491 (1938).
[4] Hodge, W. W.; Ind. & Eng. Chem. 31, 1364 (1939).

# New Production Ideas . . .

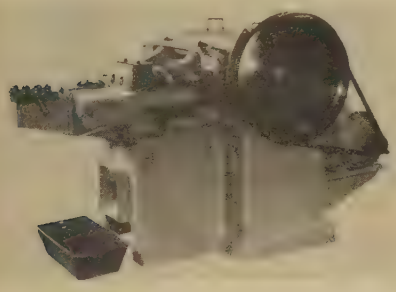
Heat treating units, a nail machine, an automotive drilling machine, a car axle lathe, projection and spot welders, a dual-pressure preformer, and a broaching and assembly press are described this week, together with a gear checking head, cutters, electrodes, trolley and belt conveyers, a fork truck, an industrial stoker, and a general purpose turbine.

### Heat Treating Units

LOWER heat treating costs are claimed for the Series T automatic heat treating units, products of *Ipsen Industries, Inc.*, Rockford, Ill. Outstanding characteristics are simple design and efficient operation. A batch loading furnace is connected and sealed to an automatic quenching tank. Automatic controllers assure a uniform time-heating cycle, air cool or oil quench, and signals the operator for a recharge. Once a heating cycle is set, the human element is no longer a hazard. The units are made in two standard sizes, furnished with gas or electric heat. They are mounted directly to the floor affording easy installation.

### Nail Machine

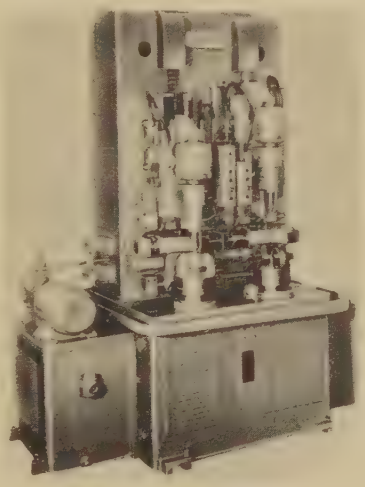
A HEAVY duty nail machine of all steel construction, so designed that noise and vibration are reduced to a minimum, has been announced by *Black Industries*, 1400 E. 222nd St., Cleveland. Cams,



crankshafts, and feed mechanism are pressure lubricated and the circular cross-head floats on a film of oil. The machine has a delayed feed action so that the gripper does not pinch until the wire is fully stopped. The length of feed covering the full range of sizes from ½ to 2¾-in. nails is adjustable while the machine is in operation. No. 10 to 14 gage wire may be used. The machine is operated by a 5 hp motor through V belts to a safety shielded flywheel.

### Automotive Drilling

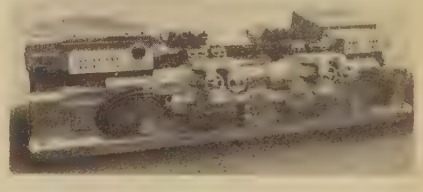
UNSKILLED operators can drill and face 444 pistons an hour, according to *Snyder Tool & Engineering Co.*, Detroit, who have built a special machine for this purpose. The operation consists of cen-



ter drilling the head end of the piston and facing a portion of the piston head, these surfaces then serving as locating points for succeeding operations. This machine is equipped with two Snyder standard, hydraulically actuated slide units carrying single spindle heads used for the center drilling operation. Facing slides and tool blocks are mounted on the face of the machine column and are hydraulically actuated in horizontal position. Two rotating 4-jaw chucks are mounted in the machine base directly beneath the centering spindles, two of the 4 jaws having radial locators. Jaws are hydraulically actuated. Chucks are equipped with a height locator which contacts the inside of the piston head and establishes a controlled thickness during the top facing operation. Required floor space is 50x44 in.

### Railroad Axle Lathe

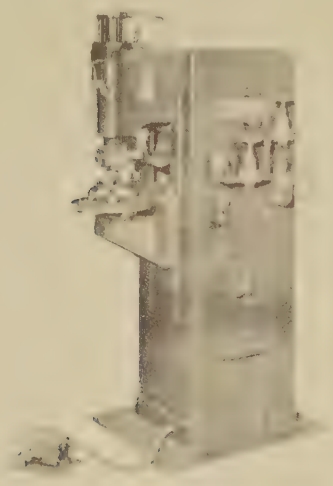
AN automatic car axle lathe introduced by *Morey Machinery Co., Inc.*, 410 Broome St., New York, is a hydraulically operated, electrically controlled automatic lathe for rough or finish turning the wheel seat and journal diameters of railroad axles. Hydraulic power is employed for all chucking, clamping, feed and traverse movements. An end drive chucking method is used to hold the axle by hydraulic pressure from the tailstock quill towards the headstock spindle. This chucking method leaves the center of the machine free for the installation of an automatic loading device. The machine is designed for multiple tooling with carbide tools. Main spindle drive is designed to transmit 150 hp at continuous duty allowing for mo-



mentary overloads up to 225 hp. Machining cycle per axle takes between 2 and 3 min, allowing a production rate of 200 axles per 8 hr shift. Push button controls are provided for automatic work cycle as well as individual functions.

### Projection Welder

FOR light welding jobs where speed is desirable, a new projection welder has been designed by *Acme Electric Welder Co.*, 2618



Fruitland Rd., Los Angeles 11. The welder is an air operated, press type, direct action projection welding machine, supplied in either 20, 30, or 40 kva. Horn adapters and horns to convert for conventional spot welding are available. A solenoid operated air valve with a single or two stage foot switch is furnished on the PT-O. Standard throat length is 6 in.; when converted to a spot welder, throat length is increased 6 in.

### Welding Electrode

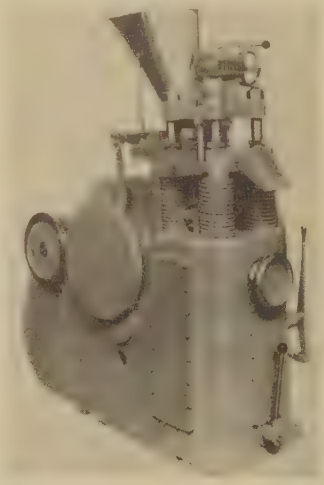
A NEW low-hydrogen type coated electrode designed to prevent underbead cracking in weld deposits has been announced by *Air Reduction Sales Co.*, 60 E. 42nd St., New York 17. Designated Airco No. 394, this electrode may be used on ac or dc and is said to give welds of 100,000 psi. The electrode is recommended particularly for use in the fabrication of hardenable steels which are susceptible to underbead cracking when conventional types of electrodes are used without preheat. It is recommended also as a high-tensile companion to the No. 312 which is used on mild steel to produce a tensile strength in excess of 60,000 psi.

### Arc Welding Electrodes

FOUR new electrodes developed for use in a wide range of arc welding operations have been announced by *General Electric Co.*, Schenectady 5. Type W-60 is an electrode with a low-hydrogen coating, manganese-moly analysis, suitable for welding most hardenable steels where the hazards of underbead cracking are to be eliminated. Type W-61, a low-hydrogen electrode of a moly-vanadium composition, can be used with either ac or reverse polarity dc to weld a wide variety of low-alloy steels. A low-hydrogen, titania-coated electrode of 2½ pct nickel composition, type W-62, can be used on steel castings of a similar analysis and for producing weld deposits having high impact properties at sub-zero temperatures. Type W-95 deposits extremely hard wear-resisting weld metal in all positions, using ac or dc.

### Dual-Pressure Preformer

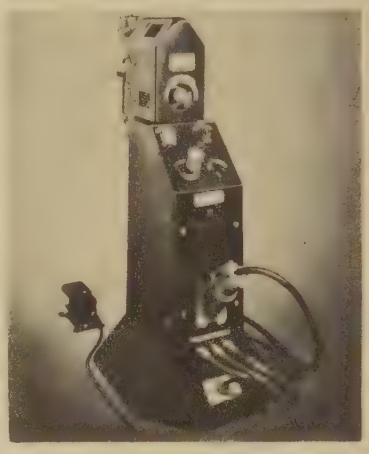
BY means of a floating die table, pressure in the Model 294 preformer, designed by *F. J. Stokes Machine Co.*, 5904 Tabor Rd., Philadelphia, is applied from both top and bottom at the same time to produce preforms of uniform density throughout. Less power is required to apply high pressure, and punch and die wear is reduced, due to this design. Preforms are produced up to 4 in. diam with a die fill of 2⅝ in. Large die area



permits making irregular and rectangular pieces up to 6 x 4 in. Rugged construction, convenient hand-wheel adjustment while operating, self-lubrication, and dust-seals on plunger and tie rods are features.

### Spot Welder

THE Fusionette, said to approach the performance of a capacity discharge type welder but at lower cost, is designed as a general purpose spot welder with low impedance and high power factor. Welds are said to be produced with a minimum surface discoloration and the unit is recommended for multiple layer and shunt welds. The



machine welds stock from 0.004 to 0.100 in., aluminum up to 0.040 in. without special preparation, and stainless steel with a minimum surface disturbance. The welder, made by *Primeweld Corp.*, 2842 W. Grand Blvd., Detroit 2, features quick disconnects on air, water and electric wiring for portable use. Pedestal control unit and panel are adjustable 4 in. to vary throat height. Maximum space required is 19x39 in. and the welder is designed for use on 110-220 v ac, 60 cycle current.

### Midget Mills

THREE new carbide midget mills in popular shapes are offered by *Severance Tool Industries, Inc.*, 742 Iowa St., Saginaw, Mich. They are for use on larger production parts, and are said to outlast high-speed types 30 to 50 times, to cut materials up to Rc63 and to speed production. They may be used in freehand operations manually or can be chucked in machines with the work manipulated manually or mechanically.

### Broaching-Assembly Press

A SELF-CONTAINED machine suitable for broaching and for assembly or die work that requires accurate alignment and a minmum of deflection has been designed by *Greenerd Arbor Press Co.*, Nashua, N. H. A 2-7/16 in. diam high alloy steel heat-treated and ground ram is guided on ways to keep the ram accurately in line the full length of travel. Ram down speed is ad-

justable from 20 to 300 ipm, with a return speed up at the rate of 460 ipm. The press is equipped with coolant for wet broaching. The G6-S-W-C has a maximum pressure of 6 tons, is driven with a 10 hp motor, interconnected by three V belts with hydraulic pump. Pressure may be adjusted from ¾ to 6 tons. The machine receives up to 12-in. diameters. Maximum daylight opening is 21 in. and ram travel is adjustable from 1 to 18 in., controlled by power stops. The machine is also made in 4 and 8-ton models.

### Pneumatic Die Cushion

THE new model die cushion, announced by *Dayton Rogers Mfg. Co.*, 2824 13th Ave., Minneapolis 7, is used where four suspension rods carry the mounting plate which supports the die cushion cylinder. The hardened and ground pin pressure pad is machine cut to fit the press bed opening. Two stop rods are furnished to prevent the cylinder from becoming detached from the lower piston section should the air be turned on when the bolster plate is removed. Greasing is arranged by special fittings at the front of the lower cylinder section. Die cushions are furnished in ring holding pressures from 1½ to 75 tons on 100 lb airline.

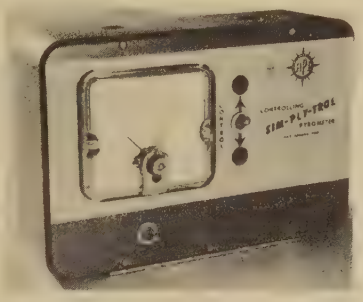
### Gear Checking Head

HELIX angle wobble of a gear, its size, eccentricity, and roughness of roll can be determined simultaneously or separately, with the new Red Ring checking head

designed by *National Broach & Machine Co.*, 5600 St. Jean, Detroit 13. The work gear is rolled with a master gear under predetermined pressure. The spindle that carries the master gear holder is mounted in a yoke that may be rotated through 90°. This spindle is so mounted that when the two gears are under uniform spring loaded contact, it is very sensitive to both axial and radial displacement. Such displacements are measured by precision dial indicators located on the head, behind the spindle yoke. The head may be used on any standard Red Ring gear checkers.

### Pyrometer

THE Simplytrol indicating and controlling pyrometer announced by *Assembly Products Inc.*, Main and Bell Sts., Chagrin Falls, Ohio, is a thermocouple type control for furnaces, ovens, kilns, etc., and operates on the micro-contact principle developed by the company.




The high resistance millivoltmeter indicator has platinum contacts that close when the set temperature is reached. Positive contact is assured by the micro-contact arrangement that operates at the instant of initial contact, locking the contacts together with sufficient pressure to prevent chattering or floating. The Simplytrol is an extremely low differential controller, the difference between shut off and turn on millivolts being nearly zero. The load control switch is rated at 10 amp, 125 v. Indicators calibrated in both Fahrenheit and Centigrade are available. The instrument operates from 110 to 220 v ac or 110 v dc.

### Air Pressure Regulators

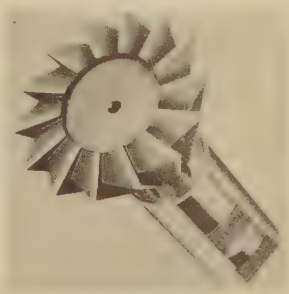
TWO new air pressure regulators designed for specific applications on compressed air supply lines feature a free-floating valve stem for backing off or reducing delivered pressure under dead end conditions by turning the adjusting knob. They are recommended for air cylinder installations where it may be desirable to reduce the applied pressure without exhausting the cylinder. Series PRD are equipped with a flange for panel mounting where the adjusting knob extends through to the front of an instrument board, while the valve is back of the board for pipe installations. LRD regulators are for installations where it is desirable to lock the adjusting knob against unauthorized change of pressure setting. Disk arrangement provides 36 possible locking combinations and fine pressure adjustment. Both of these regulators made by *Hannifin Corp.*, 1101 S. Kilbourn Ave., Chicago 24, are available in ⅜ and ½-in. sizes for primary pressures up to 150 psi and secondary pressures of from 5 to 125 psi.

### Die Lifters

SELF-ALIGNING die lifters for handling dies, machine tools and other heavy objects have been announced by *Modern Collet & Machine Co.*, 401 Salliotte St., Ecorse 18, Mich. The units consist of a swiveling eye, which accommodates standard lifting hooks, and a stud assembly at the bottom, which turns as a unit for attaching and removing the die lifter. These die lifters are available in four sizes with maximum lifting capacities of 16, 28, 40 and 100 tons each. Studs are of ¾, 1, 1¼, and 1½ in., respectively, and have uniform standard threads.

### Angular Cutters

FOR cutting dovetails and similar work, angular cutters now available reduce set-up time and are said to be truer running than the threaded hole type of cutters. They are recommended for use in



Weldon holders but may be used in collets. Made by *Weldon Tool Co.*, 3000 Woodhill Road, Cleveland 4, the cutters are furnished in 60° angle and right hand cut.

### General Purpose Turbine

FOR driving industrial pumps, fans, blowers, compressors, and smaller generators, the Typee, all-weather general purpose turbine has been announced by *Westinghouse Electric Corp.*, 306 Fourth Ave., Pittsburgh 30. A choice of

three wheel sizes, 16, 20, and 25 in., permits the turbines to be applied over a range of 5 to 1500 hp with steam conditions up to 600 lb gage at 750°F, and speeds of 1000 to 7000 rpm. Equipped with heavy duty parts the turbine will operate at 1500 lb gage at 950°F.

### Sheet Feeding Table

A 10,000-lb hydraulic sheet feeding table has a 16-in. range of elevation to handle shorter and more compact bundles as 5-ton loads. This table has a lowered height of 26 in. and an elevated height of 42 in. to permit the top of the pile to be maintained at press bed height until the last sheet is handled. This is a portable device and can be loaded in a storage area and maneuvered into place by an industrial power truck for which a towing eye is provided. Standard equipment includes a two-speed foot pump with 5 ft of hydraulic hose and a floor lock. Dimensions of this table which is made by *Lyon-Raymond Corp.*, 6204 Madison St., Greene, N. Y., are 36 in. wide by 66 in. long. Side extensions can be provided that will increase width to 48 in. and end extensions are available to extend length to 96 in.

### Trolley Conveyer

AN overhead cable type trolley conveyer with roller chain type driving sprocket permitting trolley spacing to 1¼ in. increments has been announced by *Smith Power Transmission Co.*, 1550 E. 23rd St., Cleveland. Trolleys are cast split design to eliminate threading on cable and also to facilitate adding, removing or changing centers of trolleys. The conveyer will operate on horizontal plane, 45° max rise or dip in vertical plane.

### Flat Belt Conveyer

RE-DESIGNED for handling coal, coke and cinders, Model 481 flat belt conveyer has capacities of 70 to 100 tons per hr and is furnished with belt widths of 14 to 18 in., in lengths from 20 to 40 ft. It is driven by air; water or water-cooled engine or electric motor with protective housing. Features include rubber pulley lagging which is replaceable without removal of pulley; cam adjusted feed and pulley; and a scraper plate tip which adjusts to pulley position for accurate alignment. Uses of this model which is made by *George Haiss Mfg. Co., Inc.*, division of Pettibone Mulliken Corp., 141st St. and Park Ave., New York 51, are listed as moving coal and coke from pile to truck; radial storage installations; unloading hopper bottom cars in conjunction with car unloaders made by this company.

### Fork Truck

A NEW, gas-powered fork truck of 2000-lb capacity at 24 in. from heel of fork, has been announced by *Tract-R-Lift Corp.*, 605 N. Aberdeen St., Chicago. Measuring 28 in. wide x 61 in. long x 60 in. high and weighing 3050 lb, this truck has a turning radius inside of 6 in.; outside 67 in. A single hydraulic lift-and-tilt control lever raises or lowers the forks and tilts load forward or backward in any combination of simultaneous movements desired. Maximum fork height with 5-ft mast is 84 in.; with 7-ft mast, 108 in. The mast has a 5° forward tilt and a 10° backward tilt. Speeds up to 10.9 mph forward and 8.9 mph in reverse are provided, with low speed gears in both forward and reverse.

### Industrial Stoker

COMPLETE, economical combustion of any grade of coal, including lignite, is possible with the spreader-type industrial stoker, Centrafire, announced by *Westinghouse Electric Corp.*, 306 Fourth Ave., Pittsburgh 30. In the stoker, coal is trajected by an air cooled, hydraulic motor-driven rotor so that it falls evenly over the entire length of a Westinghouse Link-Grate. Undulation of the central grate keeps the fuel bed active and moving toward the ash discharge grates at the sides. Ashes are discharged from the furnace without interrupting the coal feed, reducing load, or loss of steam pressure. A deficiency of primary air rising through the central grate is deliberately maintained. Resulting monoxides are burned in a turbulent secondary air supply above the trajectory of incoming fuels. An increased supply of metered primary air is admitted through the side areas of the grate to provide complete combustion. Coal is fed to the rotor by two long-stroke, slow-speed rams. A constant speed motor or turbine supplies oil pressure for all controls and drives.

### Synthetic Enamel

A NEW synthetic enamel finish, called Superclad, that is said to perform equally as well as porcelain for many types of uses has been developed by *Sherwin-Williams Co.*, 101 Prospect Ave., N.W., Cleveland. The finish resists alkais and acids. Laboratory tests using 10 pct alkali solution in one instance and a 10 pct solution of sulfuric acid in another case showed that Superclad was in good condition after 18 months. The finish also withstands humidity and salt spray. The coating lends itself to baking with infra-red or convection type equipment.

### Low Speed Screw Drivers

A NEW line of low-speed, high-torque air screw drivers and nut setters, announced by *Aro Equipment Corp.*, Bryan, Ohio, consists of 12 models in a range from 450 to 1100 rpm. Pistol type and lever type air tools with positive clutch or friction clutch are available. These tools provide a higher driving torque so that larger size screws and nuts can be driven; the tools will drive ¼-in. screws and bolts at higher speeds, but will handle up to 5/16-in. bolt size at slow speed of 450 rpm. Slow speeds of 450 to 750 rpm are particularly suited to self-tapping screws and cross recessed head screws.

### Drafting Machine

CLAIMED to save up to 50 pct drafting labor time and cost, a stainless steel drafting machine now available from *Emmert Mfg. Co.*, Waynesboro, Pa., operates with accuracy on any size or make of drawing board without the addition of extra equipment or alteration of the board. Indexing of angles is facilitated through the use of a micromatic quadrant, which allows indexing of every 3°. Adjustments as fine as 2½′ can be made by turning the minute adjusting screw.

ASK STOKES

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If you're giving any thought to Higher Vacuum, let Stokes help. F. J. Stokes Machine Company, 5904 Tabor Road, Philadelphia 20, Penna.

Stokes makes Chemical and Food Processing Equipment, High Vacuum Pumps and Gages, Vacuum and Atmospheric Dryers, Pharmaceutical Equipment, Tablet Machines, Water Stills, and many Special Processing Machines.

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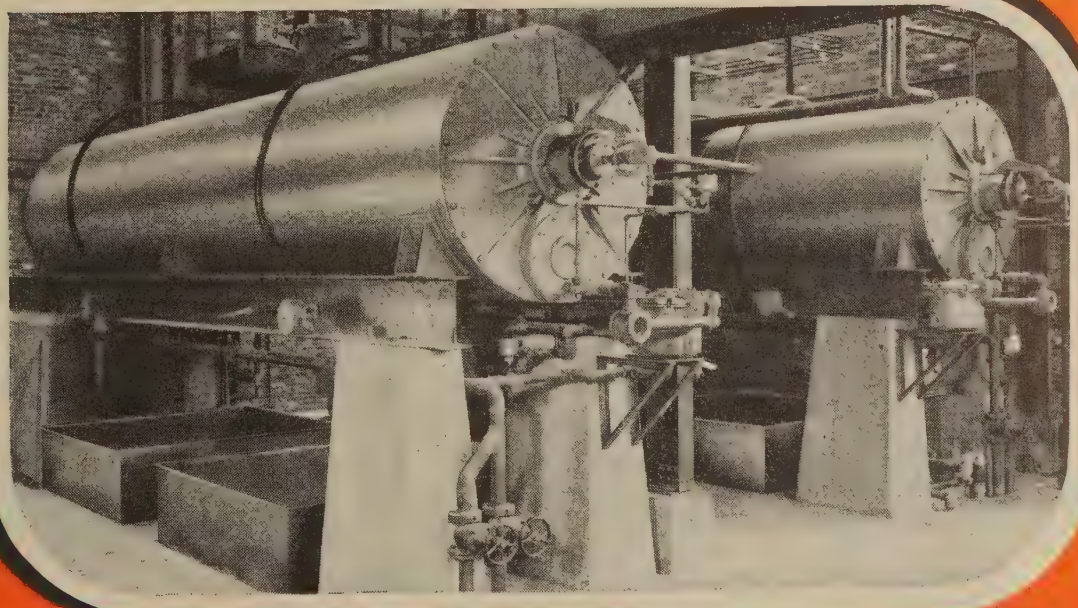
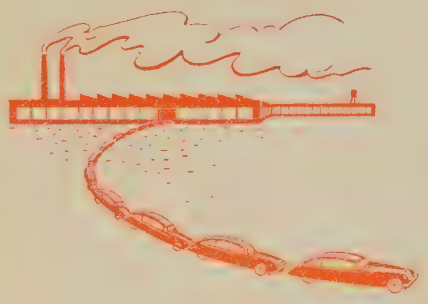


# STOKES KNOWS HOW

# Assembly Line . . .

WALTER G. PATTON

**• Briggs strike ends as 100,000 return to their jobs . . . K-F announces its 1949 model . . . New Delco clock introduced . . . Hudson uses plastic models to illustrate novel frame construction . . . Willys-Overland exports 70,000 vehicles.**



DETROIT—It has cost more than 100,000 auto workers an estimated $15 million to learn that plant guards couldn't draw pay for more than 5 min while they change clothes.

In a 2-year contract signed last week by the Briggs Mfg. Co. and the United Guard Workers of America, neither of the unions primary demands was granted. The union had asked for premium pay on Saturdays and Sundays and a paid 15 min period for changing clothes.

At the present time Briggs is paying for 5 min preshift time to its plant guards. The union asked for 15 min pay. Most sources here agree that a 5 min preparation period is ample. It is also prevailing practice not to pay premium wages to guards for weekend service. On both counts the union was reaching for new wage ground and in both claims union officials were slapped down, according to informed sources. One auto plant, operating under different conditions, pays guards the equivalent of 30 min extra time.

During the strike which started Sept. 8, all Chrysler divisions and Packard were closed down. An estimated 50,000 workers in supplier plants were idled while the ambitious leaders of 170 plant guards Local 114 overreached themselves in an effort to demonstrate the strength of the tiny unaffiliated plant guards union.

The new Briggs contract embodies most of the features of the old contract plus 20 new stipulations most of which are contractual rather than economic. No important economic concessions were involved. The company has agreed to withdraw its unfair labor charges filed with the National Labor Relations Board.

A blow to many nonstriking Briggs workers was the ruling by the Michigan Compensation Commission to the effect that idle Briggs workers are not eligible for compensation benefits unless they are ex GI's. It has been estimated that approximately one third of the Briggs workers are eligible to file claims under a federal statute differing somewhat from the state unemployment law.

* * *

THE 1949 Kaiser special and deluxe sedans announced publicly last week by more than 4000 dealers throughout the country, incorporated more than 100 changes. Major improvements include an increase in horsepower from 100 to 112, improved clutch, steering, accelerator and brake mechanisms, a restyled body that is 3 in. lower than the earlier models, a new die cast grille, and redesigned bumpers, fenders, hood and other body panels.

Overall height of 64½ in. has been maintained. The addition fenders and chrome-trimmed rocker panels brings the silhouette 3 in. lower than the previous models. Overall length of the Kaiser model has increased 3½ in. to 206.5 in. New dies for the trunk lid, rocker panels and fenders as well as some new door dies were required to make the body changes.

The front grille has been lowered and extra large parking lamps have been added. The bumper is one piece, wrap-around type.

New pull-type door handles are used and a new trunk lid handle and tail and stop lights are specified. The recessed license plate in the rear has been eliminated.

The instrument panel has been completely restyled and indicators are silicone-treated. Interior fitings have been completely redesigned.

According to K-F engineers, the new steering linkage shortens the turning radius by 11 pct. There is a redesigned gear shift mechanism and a new clutch mechanism eliminating 52 parts from the earlier design. Brakes have been redesigned to permit 18 pct less pedal pressure.

Redesign of the frame crossmember which supports the rear of the engine in the 1949 car offers greater road clearance than the earlier model.

Rocker panels are integral with the body and redesigning of supporting members inside the metal shell of the doors gives additional rigidity.

Longer front coil springs are used to give a softer ride.

Other improvements include new hand brake linkage, respacing of the brake and clutch pedals and new gravel shields, front and rear.

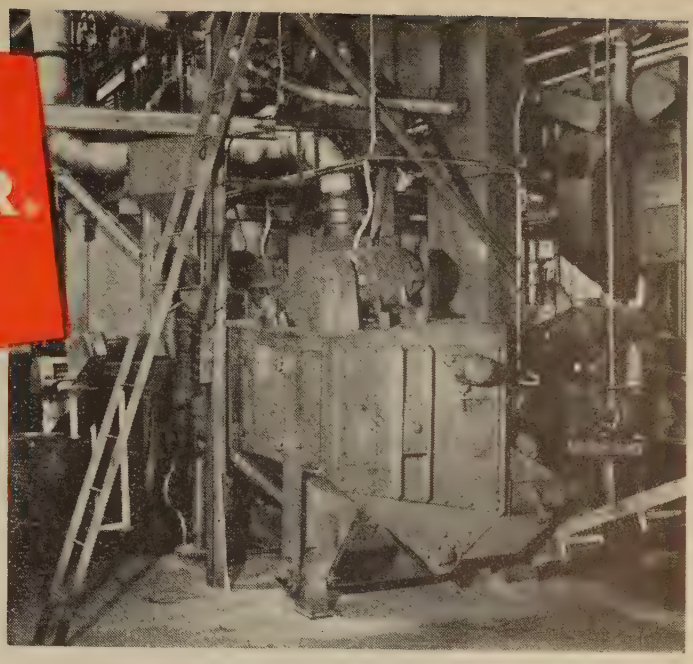
K-F engineers claim 15 improvements for the 1949 deluxe sedan, including improved dual-throat carburetor which is responsible for the increased horsepower without sacrificing economy. Hudson and K-F are the only producers using this device on a six-cylinder car.

The engine is mounted at three points on resilient live rubber blocks and the rear mountings on a newly designed cross member in the frame. Compression ratio is unchanged at 7.5 to 1.

Cooling fins in the radiator have been fully shrouded, resulting in a gain of 9 pct in cooling efficiency according to K-F engineers. The new radiator is side-mounted and no tie rods are used. A new muffler and exhaust pipe is specified.

According to Edgar F. Kaiser,

# Continuous WHEELABRATOR TUMBLAST



## *replaces 4 machines releases 4 men*

**at a prominent motor co.***

In a Michigan Motor Car Plant four table-type blast machines were required to clean their production of forged and heat treated connecting rods. NOW a SINGLE 26″ Continuous "Wheelabrator" Tumblast easily handles the entire job . . . cleaning scale from 2,800 to 3,200 rods hourly with four less men per shift.

This plant also uses a 15″ Continuous Wheelabrator Tumblast for removing scale from connecting rod caps. It cleans 8,400 of these each hour for a total of 67,200 caps in eight hours.

The Continuous Wheelabrator Tumblast utilizes the unique combination of tumbling and continuous longitudinal travel of the work beneath the blast stream. Passing through the abrasive barrage of an Airless Wheelabrator Unit, the work is scoured brilliantly clean in a matter of seconds.

*Name on Request

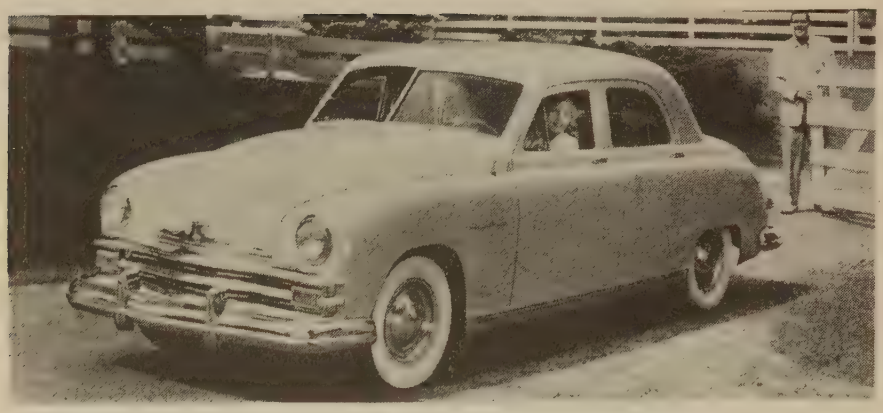
Interior of machine. Only three or four minutes are required from the time a connecting rod enters the cleaning chamber until it is finally discharged from the machine in perfectly clean condition.

### CONTINUOUS WHEELABRATOR ADVANTAGES

- **INCREASES PRODUCTION** by eliminating the time lost in a conventional batch type mill for starting, stopping, loading and unloading.
- **LENDS ITSELF TO LINE PRODUCTION** because of its continuous operation.
- **PROVIDES BETTER BLAST COVERAGE** . . . the work is completely exposed as it tumbles and travels progressively under the blast of one or more Wheelabrators.
- **REDUCES FLOOR SPACE REQUIREMENTS** because it does the work of a number of machines.
- **LESS POWER NEEDED** . . . and less connected load.

*The operating principles of the Continuous Wheelabrator Tumblast are fully described in this informative new bulletin. Write for your free copy today.*

**American**
WHEELABRATOR & EQUIPMENT CORP.
(Formerly American Foundry Equipment Co.)
510 S. Byrkit St., Mishawaka 7, Indiana



HUNDRED CHANGES: *In contrast with the usual "face-lifting," Kaiser-Frazer is making* 100 *changes in its* 1949 *models. Among the major improvements is an increase from* 100 *to* 112 *in engine hp. Significant changes in clutch, steering mechanism and braking have also been incorporated in the new cars.*

vice-president and general manager, engineering and tooling costs for the new model exceeded $10 million. The first 1949 model, number 279,195, was produced Aug. 24. Current production averages 600 per day and an output of 900 per day is planned.

* * *

DELCO Appliance Div. of General Motors Corp. is producing a new type of clock for automobiles which is said to be revolutionary both from the standpoint of design and manufacturing.

The new Delco clock is a completely redesigned mechanism in which highspeed movies were used extensively to determine the new design.

The new clocks use a balance wheel only for the purpose of maintaining an accurate and uniform beat. An armature drives the clock mechanism and its impulses are regulated by an electric current controlled by the balance wheel which has no mechanical connection. The clock itself consists of four major components; a balance wheel assembly; a contact assembly; a coil and driving armature assembly; and the reduction gear assembly.

The four major units are assembled in air conditioned, dust-free rooms. Balance wheels are checked with special laboratory equipment which is said to be accurate to .000001 of an ounce-inch.

The new clocks are designed to be insensitive to temperature changes. Noise, a source of distraction to many motorists, is said to be largely eliminated. The manufacturer recommends installation on the dash rather than on the glove compartment door, where closing of the compartment subjects the clock to severe strain.

* * *

HUDSON has outdone all the other auto manufacturers who have supplied scale models of their new cars with an exact replica in plastic of its four-door sedan. Built to a 1/16 scale, the new precision model is designed to put across Hudson's sales story of its recessed floors, cradling of the seat between the wheels and other construction details of the Monobilt body-and-frame.

Models are 13 in. long. One side of the model is finished two-tone color; the other side is transparent, showing complete construction details. Use of transparent plastic makes it possible to show the frame details to excellent advantage.

The other side of the car is reproduced exactly so the model can be turned over for examination of the entire underframe of the car.

The dies for the new model are said to have cost $35,000.

The model is built in two units. The main unit consists of the body and frame from which the second unit, made up of the hood, front fenders and grille can be readily detached. Detached from the hood, front fenders and grille, the main unit serves to emphasize the one-piece welded construction of the new car.

To assemble the model cars, the manufacturer has set up a small assembly line in its own plant. Standard assembly line techniques are used to produce the cars which are being built at a rate of a car every minute.

The Willys-Overland policy of concentrating its sales effort in the so-called neglected markets is paying off. Willys-Overland now ranks first in volume of export among independent automobile manufacturers. Since the war Willys has accounted for over 5 pct of the automotive exports of all U. S. and Canadian cars. During the period W-O has exported 70,000 vehicles including 53,000 Jeeps, 12,000 station wagons, and over 5000 trucks.

At the present time Willy-Overland distributors are undertaking expansion programs in many foreign countries. Since the war more than 13,000 Willys-Overland vehicles have been shipped to Europe, despite obstacles in trading, it was disclosed.

## Auto Administrators Meet

*Detroit*

• • • **More than** 500 state motor vehicle officials met in Detroit, recently, for the 16th Annual Conference of the American Assn. of Motor Vehicles Administrators. Delegates from each of the 48 states plus five provinces of Canada attended the conference which discussed highway laws, driver licenses, state reciprocity, pedestrian problems, vehicle inspection and engineering developments of motor vehicles as related to state automotive laws.

Charles F. Kettering, research consultant for General Motors, addressed the group at a meeting which was attended by top officials of all Detroit automotive companies.

L. L. Colbert, president of Dodge Div. of Chrysler Corp., was guest speaker at the annual banquet.

## Auto Registrations Up

*Detroit*

• • • **Registrations of** new passenger cars will reach 275,000 during July and domestic truck sales will aggregate 93,000 units during the month, according to R. L. Polk & Co., Detroit, statisticians for the automotive industry.

Total registration of new passenger cars during June was 246,926, Polk said. Similarly, the number of trucks registered in June was 87,324. The record breaking month for new truck registrations was April when 108,168 vehicles were titled.

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# Washington . . .

EUGENE J. HARDY

**• Standby orders for machine tools completed . . . Pattern set for other metalworking industries . . . Emergency plans include control measures for industry.**

WASHINGTON — With standby pool orders for 100,000 machine tools now in the hands of the machine tool industry the National Security Resources Board is moving ahead with plans to include many other types of production equipment in its program of preparation for any future "M" Day. Considering plant equipment, including machine tools, as the first emergency requirement, with initial demand as great as in World War II, NSRB naturally is concentrating on commodities of this type in the initial stages of the preparedness program. However it is expected that many other standard types of equipment will be blanketed in the standby order program, including such things as electric motors, standard steel shapes, and even consumer products such as shoes.

Basic objective of the plan, worked out by Major General S. E. Reinel and E. R. Henning, director and assistant director of NSRB's Machine Tool Division, is to have the advance paper work out of the way in the event of future emergency. Once the standby order is placed the manufacturer can begin to plan for getting into production on "M" Day. This advance planning will also eliminate the mad rush to Washington on the part of industry should war break out.

Military planners consider this aspect vitally important, since it is considered very likely that Washington and other important cities may be the object of immediate attack in the event of war, which would not permit the gradual evolution of administrative and control measures.

Come "M" Day, the standby orders will be made effective by notification from some government agency, probably the Reconstruction Finance Corp. since this is the only government body possessing funds which may be used immediately for emergency purposes. The government will not undertake to purchase the commodities covered by the orders, but it will guarantee to purchase anything that cannot be sold.

THE 100,000 machine tool program is serving as a pattern for additional plans now in the works. Now under discussion at NSRB are standby orders for the following types of plant equipment; metal forming and shaping machines, cutting tools, gages and precision measuring tools, light power and hand tools, portable electric and pneumatic tools, abrasive products, foundry equipment and supplies and metal-melting furnaces, industrial heat-treating furnaces and ovens, cranes and hoists, monorail systems and chains.

The machine tool program got under way with a survey of plant capacity in some 300 plants. This survey, conducted by the Dept. of Commerce, gave NSRB the basic data on which to form a program for standby orders. It was found that the machine tool industry is currently operating at an annual volume of about $300 million. Its present capacity is estimated at twice that figure, based on a single shift 40-hr week. This existing capacity is considerably in excess of hitherto peacetime levels.

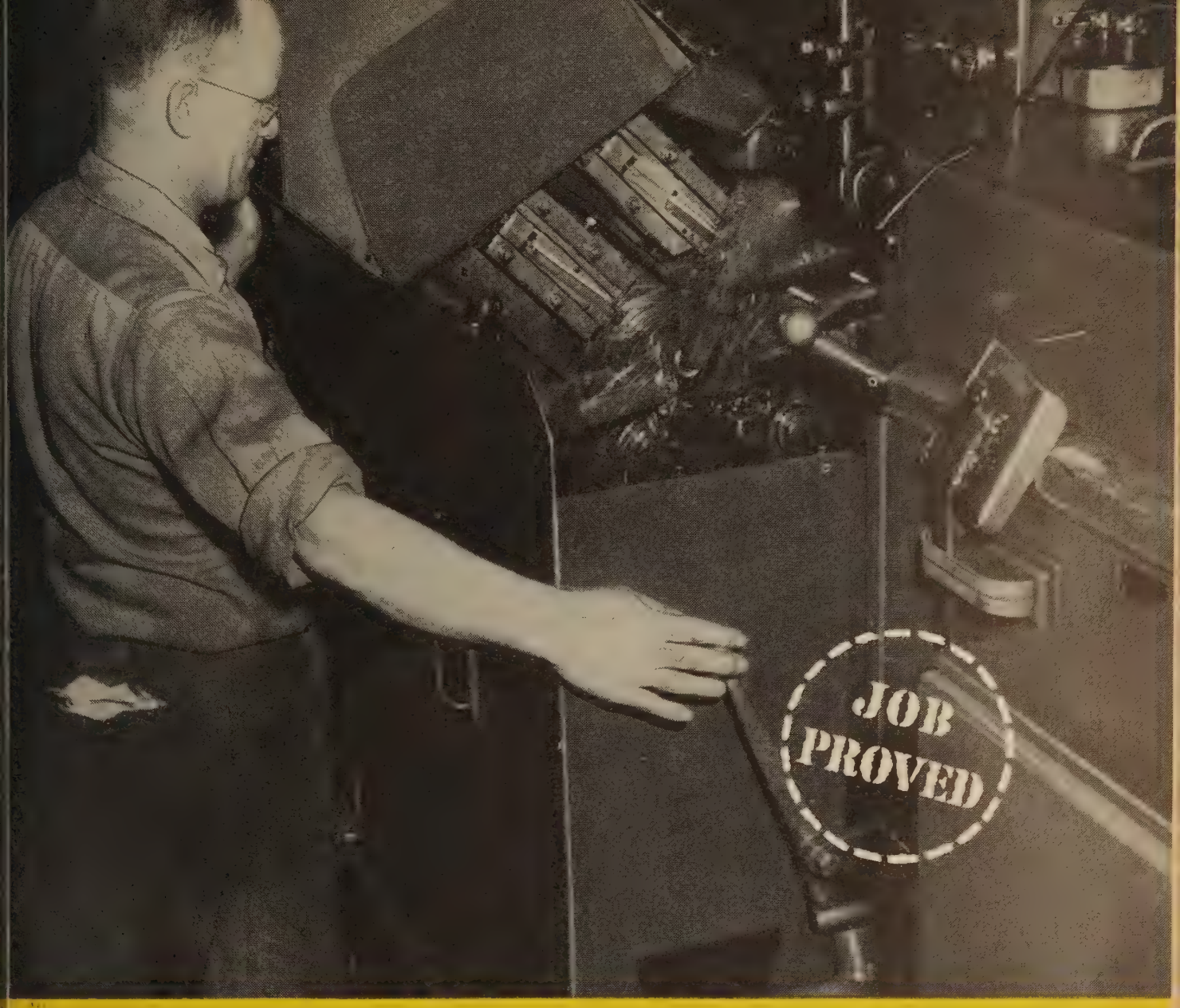
There are installed approximately 1,775,000 units of metalworking machinery in the United States, upwards of 700,000 more than in 1940, according to NSRB. In addition, or set aside for reserve, there are in government storage upwards of 90,000 tools.

IN addition to the individual tools in the reserve, 151 complete plants have been retained by the Military Establishment, some in operation, others in standby readiness. Of the plants not retained by the Military Establishment, 242 have been released for disposal with a National Security Clause or other restriction requiring the plant and its equipment to be held in such state that reconversion to war production can be readily accomplished.

From these aspects, NSRB found "the position favorable, compared to 1940." It was on this group of basic facts that the standby order plan was based. Discussions were held with the military agencies, other interested government departments, and the industry. A tentative assignment of orders was made on the basis of plant capacity without necessitating undue expansion and comment on this tentative plan was received from the industry. Actual standby orders were then issued.

These orders are complete with all necessary forms, requiring the minimum of administrative action to put them into effect in an emergency. To avoid the overproduction of accessories, as occurred in World War II, standard accessories have been limited. The standby pool orders will be reviewed at least once a year to assure that they conform to any changes in arms programs in the war plans, or radical changes in machine tool builders' capacities.

NSRB makes it clear that the figure of 100,000 tools is not related to requirements, which cannot be forecast in exact figures. However, it is believed to be of a magnitude




# ONE OIL DOES TWO JOBS

## One New Sunicut Grade with Petrofac* Replaces Two Oils, Gives Improved Performance and Lowers Costs

**Part:** Knurled rise nuts for Stillson wrenches
**Operation:** Spot, drill, knurl, and cut off
**Machines:** New Britain Model 61's
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**Cycle Time:** 9.9 seconds
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A manufacturer of wrenches was using two oils in his automatic screw machines—a dark cutting oil and a lubricating oil. Replacing both with one grade of new Sunicut with Petrofac, he found the way to many benefits. Savings have been substantial. Dilution of cutting oil through seepage is no longer possible. Drain-off from chips is increased. There is only one oil to buy, store and handle. Finish is better, tool life longer, work visibility improved.

Because the new Sunicut grades with Petrofac possess superior metal-wetting, antiweld and extreme-pressure qualities, they are giving outstanding performance throughout the metal working industry. They are not blended with animal or vegetable fatty oils—cannot turn rancid. For more information write for folder IA-9.

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sufficient to start the machine tool industry toward maximum production without waiting for firm orders from arms producers.

NSRB feels that the "more important consideration is not the exact magnitude of the pool orders, but the distribution of types and sizes necessary to produce the character of munitions that latest war plans envisage." The orders for machine tools emphasize types that are likely to be short in the event of war, based largely on Warld War II experiences. It is estimated that the orders now placed will save the machine tool industry from 5 months to a year in any future emergency.

Other major conclusions reached by NSRB in its machine tool study are as follows: The industry could promptly double existing production, working a single shift 40-hr week, provided materials and labor were available; the industry would not require substantial amounts of tools to attain full war capacity; increase of plant would not be large, less, it is estimated, than 25 pct of World War II plant expansion; reserve plants inspected, in contradistinction to reserve tools, indicated a very satisfactory degree of readiness to resume war production; for the current air program, the tool requirements should not overtax the industry—technological problems of machining, rather than tools themselves, constitute the basic problem in the air program.

WITH the machine tool program being used as a pattern for similar plans for other segments of the metalworking industry its importance cannot be overemphasized. In addition to the standby order phase of the program, other recommendations, now being put into effect including preparation of emergency control legislation, are also of major importance.

For example, reserve tools are being inventoried and a standard system, based on the Standard Commodity Classification, is being set up. A central, standard distribution plan is being developed for the rapid identification and location of reserve tools, and their shipment to production facilities.

The basic control for distribution of machine tools, similar to WPB's General Preference Order E-1-b is being set up complete in all respects. While the organization of a war production agency is being set up, including plans and programs for control of the machine tool industry, should an emergency arise before completion of these plans, NSRB intends to rely temporarily upon World War II organization forms and procedures.

Control measures covering the other types of production equipment now being studied by NSRB are also being prepared.

Recognizing the fact that the machine tool industry is one of feast or famine, and expansion in wartime is almost completely in the national interest and not of ultimate profit, NSRB recommends the adoption of rapid amortization of plant and equipment of machine tool builders.

CHANNELS of authority between the Armed Services, Munitions Board, a War Production agency and industry are being established.

Authority to move government-owned tools regardless of bureau or branch in which title or sponsorship previously rested will be delegated to the war production agency.

Requisitioning orders for used or idle tools permitting control of the used machinery market are being prepared.

Finally, NSRB recommends that "in the current rearmament program, reserve tools should be used to the utmost. Disregarding economy, tools placed in arms production will assure a greater degree of tool readiness than if left in storage. Moreover, withdrawing of tools from storage will provide constant check on condition of all stored tools.

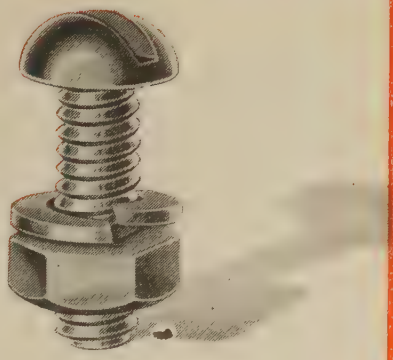
"For example, there were many tools withdrawn from the aircraft industry after termination of contracts. The condition and usability of these tools for production of modern aircraft is highly uncertain. Many are probably single purpose or special tools. If they cannot be put to use in the current air program, their usefulness a number of years hence in any emergency would be questionable.

"Parenthetically, the same use should be made in the current program of the reserve stocks of accessory equipment, cutting tools, gages, etc., which the military departments have in storage. Abrasive products, such as grinding wheels, subject to deterioration in storage, should be utilized now."

THE BULL OF THE WOODS — BY J. R. WILLIAMS

# This takes 8 seconds . . .

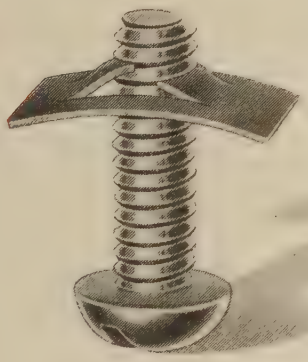
**That's the average time required to install a threaded nut, lock washer and screw, using a power screwdriver.**



# This takes 5 seconds . . .

**A savings of 37½% in time—because no lock washer is needed—no wrench is ever required! SPEED NUTS* start easier, pull down faster.**

NOTE: Figures based on study conducted by independent time-study engineers.



*The stop watch tells the story. Flat-type SPEED NUTS can be applied much faster than threaded nuts and lock washers. This time-savings can mean real dollar-savings in your assembly costs.*

Time-saving is a primary feature of the entire SPEED NUT System of Fastenings. Push-On type SPEED NUTS zip over unthreaded studs. SPEED CLIPS snap into position. SPEED CLAMPS combine several parts into one for quick installation.

Here's an example of proved savings: A leading vending machine manufacturer has reduced his assembly costs 25% with the SPEED NUT brand of fasteners. *Your* specific fastening problems may be answered in a comprehensive analysis prepared by Tinnerman engineers. Write for details on this service, and for your copy of the new SPEED NUT bulletin. TINNERMAN PRODUCTS, INC., 2038 Fulton Rd., Cleveland 13, Ohio.

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**TINNERMAN** *Speed Nuts* *Trade Mark Reg U S Pat Off

FASTEST THING IN FASTENINGS — MORE THAN 4000 SHAPES AND SIZES

# West Coast . . .

OSGOOD MURDOCK

**• Mining Congress proud of technical progress but discouraged over political handicaps . . . Backlogs of airframe makers augmented and new plane types being developed.**

SAN FRANCISCO — During 4 full days last week some 2000 mine operators, mining engineers, industrial suppliers, government bureau chiefs and miscellaneous camp followers of the mining industry filled San Francisco's hotels and gathered at the Civic Auditorium to wander through and visit the square block of exhibits and attend the six general and five operating sessions of the Western Division of the American Mining Congress.

These outstanding exhibits and demonstrations of mechanized mining techniques and advanced mechanical equipment, said to be the largest and most significant ever viewed in the West, were convincing of the mining industry's material progress and potential power for accomplishment.

However, the 44 program speakers and 44 additional chairmen and discussion leaders who appeared before the general, lunch, dinner and operating sessions presented a restless, generally unhappy and somewhat abused cross-section of the problems of the mining industry as it suffers and shrinks, mainly the victim of various applications of the law of diminishing returns.

Bureaucratic regulations, lack of a national mineral policy, tax deterrents on risk capital and federal labor relations inadequacies were all cited as adverse factors, and surprisingly the political and government representatives present were in agreement with the mining engineers and executives about the type of remedies that Congress and the federal government should consider.

James Boyd, director of the U. S. Bureau of Mines, received a unanimous vote of confidence as he pleaded for a national mining policy to include incentives for prospectors and venture capital in mining. Senators George W. Malone and Pat McCarren of Nevada met director Boyd's opening bid and raised it with calls for liberal stockpiles of strategic metals, an unrestricted market for gold and "restoring private ownership." Congressman Richard M. Nixon, California Republican, outlined proposed changes in the Taft-Hartley Act which were unanimously and eagerly seconded by the Congress to help balance labor and manpower handicaps.

Speaker after speaker pointed out that gold and silver activities have declined, new nonferrous developments are principally in already known and often well-worked properties and locations and that, despite straw grasping in certain strategic minerals, the nation continues dangerously dependent on import of manganese, chrome, tungsten, quicksilver and uranium.

John K. Gustafson, director of the division of raw materials, U. S. Atomic Energy Commission and experienced, recognized and popular mining engineer, delivered one of the most interesting papers with a forthright appeal to the mining industry to discover, develop and produce uranium ores, "best accomplished by competitive private enterprise under the stimulus of profit. Our objective is to get you into the atomic energy business. On that basis uranium producers seem assured of a market for their product."

OF the five major classes of uranium deposits being exploited now or in the future, the carnotite-type and roscoalite-type vanadium-uranium ores of the Colorado Plateau are the principal domestic source though quite inferior to the high grade hydrothermal pitchblende-radium deposits of Canada, the Belgian Congo, Czechoslovakia and Germany. The commission hopes that in the future there may be developed byroduct uranium from gold bearing conglomerate and also from uranium bearing oil shales and other marine sediments such as now are under development in Sweden.

The Atomic Energy Commission has announced a three-point program to stimulate the discovery and production of domestic uranium by private competitive enterprise in guaranteeing a 10 year minimum price of $3.50 per lb of contained $U_3O_8$ f.o.b. shipping point for small lots of domestic refined uranium and the same price for recoverable $U_3O_8$ less refining cost for mechanical concentrates assaying at least 10 pct $U_3O_8$. There is also a bonus of $10,000 for the discovery of a new deposit and production therefrom of the first 20 tons of ore or concentrates assaying 20 pct, and there is a government guaranteed 3 year minimum price for the low-grade uranium-vanadium ores of the Colorado Plateau area where the government is operating two vanadium-uranium plants.

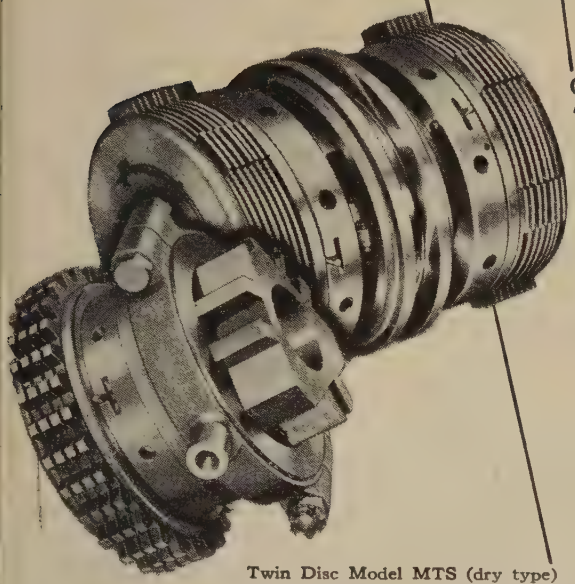
LOS ANGELES—With military contracts for varied types of jet aircraft, major air-frame manufacturers in the Pacific Southwest have turned from their gloom of a short while ago to an aggressive labor recruiting program to keep pace with accumulating backlogs. So far, neither backlogs nor employment figures approach wartime highs.

North American now appears to have the largest number of planes on order of any company, although its backlog is second in total value to Boeing.

During the war, North American turned out 42,683 military planes. Early contracts were for trainers and then followed the Mustang P-51 fighter which even now dominates the Bendix race in modified form. The production of B-25 light Mitchell bombers rounded out the picture.

Today North American has con-

# *Little* clutches for *Big* jobs



Twin Disc Model MTS (dry type) and Model MTU (oil type) Clutches.

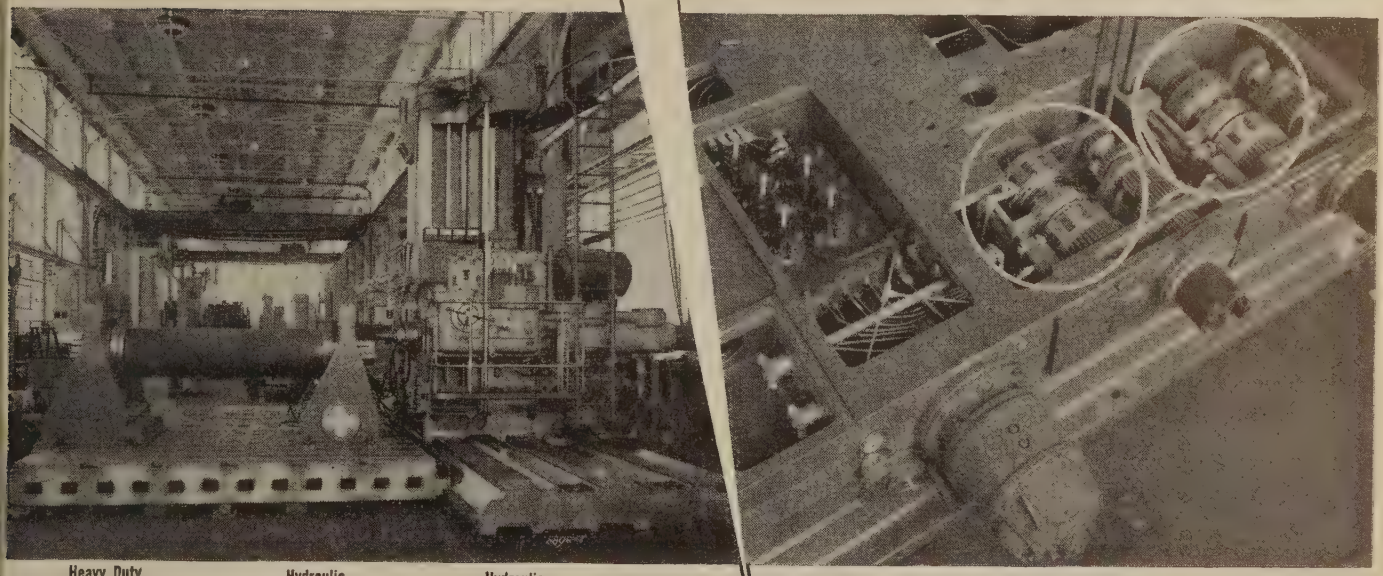
(*Left*) Producing a large steel mill roll with a Giddings and Lewis Floor-Type Horizontal Boring, Drilling and Milling Machine equipped with Twin Disc MTU Clutches. (*Right*) Two Twin Disc MTU (oil type) Clutches installed in the Giddings and Lewis Floor-Type Milling Machine.

On large milling machines, as well as on small lathes, Twin Disc Machine Tool Clutches make possible easy operation, yet occupy only a small amount of space.

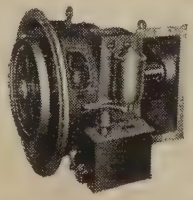
Models MTU and MTS Clutches, oil type, are designed for closed installations requiring a compact clutch that is small in size, high in torque capacity, and built to stand up under rapid-cycle operations. Operating mechanism is unaffected by centrifugal action and maximum efficiency is obtained when used with an oil spray.

Models MTU and MTS Clutches, dry type, are also adapted to machine tools and similar mechanism that are limited in space, but where operating conditions do not call for frequent continuous cycles of engagement. High grade molded asbestos driving plates replace the phosphor bronze plates installed in the oil type clutch.

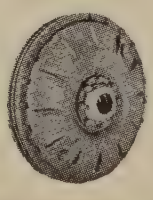
Both types of clutches provide single point adjustment in all sizes . . . both types assure greater efficiency through the relatively small number of operating parts. Twin Disc MTU and MTS Machine Tool Clutches range in size from 3″ to 9″, with working capacities from .47 to 18 hp per 100 rpm. Write for Bulletin No. 134-A. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



Heavy Duty Clutch

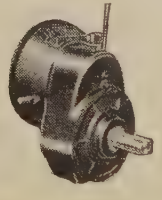


Hydraulic Torque Converter



Hydraulic Coupling

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U.S. PAT. OFF.



Reduction Gear

Marine Gear

**JUDGE TWIN DISC BY THE COMPANIES IT KEEPS**

tracts for the same three-type planes, trainers, bombers and fighters. The company has taken over the former Consolidated-Vultee plant at Downey and part of the sprawling Douglas factory at Long Beach. At Downey, the company, which is headed by J. L. Atwood with J. H. "Dutch" Kindelberger as head of the board, is producing 268 T-28 trainers.

The Long Beach plant is the headquarters for a long-range B-45 four-jet medium bomber. A contract for 190 of the planes recently was awarded after spirited competition with other companies. The home plant near Inglewood is producing the F-86 Army jet fighters. The contract for 674 of these planes with swept-back wings follows a former contract which produced the Navy jet Fury fighters. The company now has 21,500 on the payroll and a $418 million backlog for 1132 planes.

At Northrup Aircraft, in nearby Hawthorne, emphasis is being placed on engineering. Although the company has only 5000 employees, as compared with 10,000 during the war, it has doubled its engineering staff. Secret work is being done with guided missiles and supersonic experiments.

In production contracts, John Northrup and his associates are rounding out an order for 13 B-35 Flying Wings, a propeller-driven aircraft. They are preparing to start work on the B-49, which is the jet model of Flying Wing. The Air Force has ordered 30 of these. A third contract for 23 of a novel YC 125 has been received. This is a three-engine assault transport and arctic rescue plane. Bigger than a DC-3, it can take off in 500 ft and land in 300 ft, Northrup claims. It can be equipped with pontoons or skis for arctic rescue. Northrup backlog is near $100 million.

Douglas aircraft is looking forward expectantly to its entrance into the metals field. Its Western Press Metals Div. is being organized and expects to get underway some time this fall to make auto parts and other metal items. The division, which is expected to be a major one, was organized after a few fenders were made for a Glendale firm as an experiment.

IN the Douglas home plant in Santa Monica, where the metals division will be, contracts are being finished for commercial DC-6s for airlines. At its Long Beach plant, the company has an Air Force order for 28 giant C-124 four-engine transports. The El Segundo Div. is turning out Sky Raider torpedo dive bombers for the Navy.

At its plant in Burbank, Lockheed has three large Navy and Air Force contracts and is completing work on two others. Largest single-type order is for Shooting Star jet fighters, the Navy and Air Force asking for 656 of these. A new version of the Shooting Star, a two-place trainer (TF-80C) has won an Air Force award for 156 ships. This speedy jet was previewed for the press this month.

Lockheed is making 143 models of its P2V Neptune, a search patrol plane for the Navy. This is expected to extend through until 1950, according to Robert L. Gross, president.

The company is completing work on a contract for two models of the giant Navy XR60 Constitution and on orders for 15 Constellations passenger planes. Some of the latter are for air lines. The backlog totals $196,421,000 with an employment figure of 13,799.

Versatile Ryan Aircraft Co. of San Diego has returned to the limelight with a contract to build an undisclosed number of jet-powered pilotless target planes for the Air Force and Navy.

Claude Ryan, who first won note when Charles "Slim" Lindberg built his Spirit of St. Louis at the then tiny San Diego plant, has done everything from operating training schools and building planes to making coffins. During the war, he manufactured training planes and a maneuverable combination of a jet and propeller driven airplane for the Navy. The latter was completed just before V-J Day and was the first jet to land on a carrier. It took off and carried out most of its cruise by propeller force but was equipped to turn on the jet during combat action.

During the post war era, one of the lines Mr. Ryan turned to was metal coffins.

Air Force officials estimate that the new planes will cost "less than $100,000 each and will be able to hit 600 miles an hour in flight." The planes will be "clay pigeon" target ships, designed to hit high speeds to train gunners in warding off fast enemy fighter planes.

Volume of the Ryan contract will be determined after Air Force and Navy experts find out how efficient the robot planes are as targets. They will be given exhaustive tests to find out whether they'll stand up at high speeds.

New contracts have helped the Los Angeles area airframe companies accomplish postwar readjustment and probably will restore operations to a profitable basis. The depressed state of the airline business and the scarcity of foreign buyers with American dollars restricts transport and other commercial sales, but the new policy of Congress in ordering modern military aircraft has given peacetime stability to the industry.

SEATTLE — Northwest Steel Rolling Mills faces the present strike-caused fuel oil shortage with some alarm. While most of the firm's operations depend on electric power, approximately 2000 gal of fuel oil are required per day for the reheat furnace.

Incidentally, Northwest has discontinued scrapping its own ships. Last summer the firm spent $25,000 in rebuilding its dock so that it would have the proper facilities to do its own ship-breaking. However, after taking two tries at it, company officials found that they didn't have the necessary equipment to break up ships' hulls. This meant all scrap work had to be confined to the superstructure and the hulls sold as barges. All in all, the operation was too expensive for the amount of scrap obtained.

The Tacoma Narrows Bridge is beginning to take shape again, 8 years after it crashed into Puget Sound. Steelwork started when a cross-member weighing 16 tons was placed to strengthen tower No. 3 on the west end.

By the time the bridge is completed it will require some 16,000 tons of steel, most of this coming from Bethlehem Pacific. The steel underframes of the west and east approaches, which didn't go down in the accident of 1940, will do for the new and larger bridge. They will have to be altered, however, for the new plan.

Its 140-day old strike having been over for nearly 2 weeks now, the Boeing Airplane Co. announced this week that it is leasing space in the wartime built Renton plant to carry on additional development work.

# AUTOMATICALLY

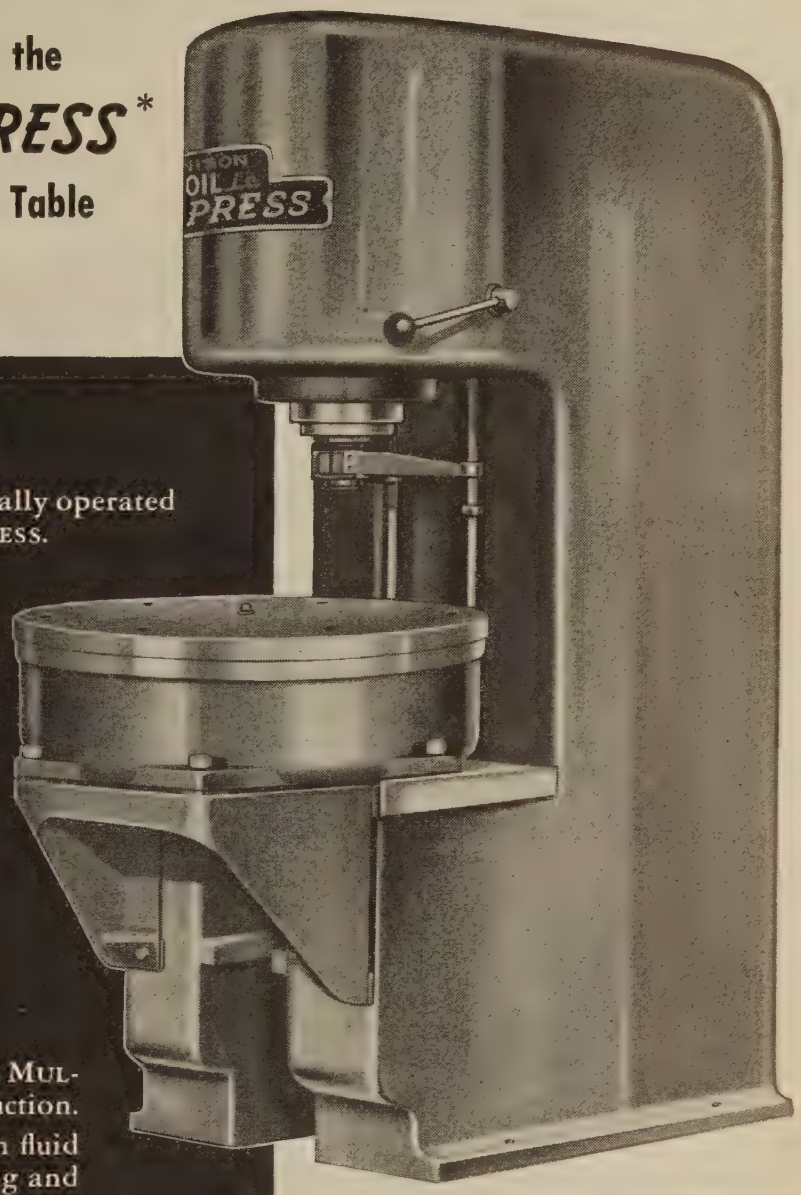
## Move Parts to the Press Ram

## and Watch Your Production Figures *SOAR!*

**That's just one advantage of the**

## NEW 25-TON *MULTIPRESS** 

**with *Automatic* Hydraulic Index Table**




- Index table is completely hydraulically operated and interlocked with the MULTIPRESS.
- Either 6 or 12 station indexing.
- Speed control for both index table and press ram.
- Accurate location of each indexing movement.
- Provision for "skipping" of non-tooled station on the index table, if desired.
- Large 33" diameter index table assures ample tooling space.
- Maximum safety of operation since operator works at front of index table.
- A variety of automatic feed devices may be used with the 25-ton MULTIPRESS to further increase production.
- Index table is driven by a Denison fluid motor, allowing continuous starting and stopping with no damage to the drive mechanism.
- Although a large machine, Denison's new 25-ton model is a FAST press—one of the fastest being manufactured today.

*T. M. REG. U. S. PAT. OFF.

Write today for complete details on this newest addition to the Denison line of MULTIPRESSES. Denison test laboratory facilities are always ready to prove the adaptability of the MULTIPRESS to your job. No obligation, of course.

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DENISON EQUIPMENT *in* APPLIED HydrOILics

**The DENISON Engineering Company**
**1158 Dublin Road • Columbus 16, Ohio**

# PERSONALS

o o o

• **H. M. Cowart,** formerly vice-president of Alabama By-Products Corp., Birmingham, has been elected a director, member of the executive committee, executive vice-president and treasurer. **Fred G. Koenig Jr.,** has been named assistant secretary and **J. Elbert Johnson,** assistant treasurer.

• **J. Russell Powell** has been appointed superintendent, Tinplate Dept., Aliquippa Works, Jones & Laughlin Steel Corp., Pittsburgh, succeeding **Charles A. Kral,** who has been appointed assistant general manager of operations for the Newport Rolling Mills, a division of International Detrola Corp. These appointments are effective Oct. 4. **J. R. Davey,** general foreman, finishing, has been named to succeed Mr. Powell as assistant superintendent, Tinplate Dept. **Cecil T. Snyder,** general foreman, cold-rolled sheet, replaces Mr. Davey as general foreman, finishing.

• **A. W. Rice** has been appointed auditor for Mack Trucks, Inc., New York, succeeding **H. S. Conklin,** who died recently.

• **G. M. Howard** has been appointed sales manager of the Food Processing Equipment Div., Detrex Corp., Detroit. For the past 10 years, Mr. Howard has been president of the Howard Engineering & Mfg. Co., Cincinnati.

• **James K. Fulks** has been appointed a director of Ex-Cell-O Corp., Detroit. Mr. Fulks joined the Corporation in 1925. **John F. Miller** has been named sales manager of the Machine Tool and Cutting Tool divisions. **D. H. McIver** has been made sales manager of the Aircraft and Miscellaneous Parts divisions. Both Mr. Miller and Mr. McIver became associated with Ex-Cell-O in 1929.

• **John E. Brennan, Jr.,** has been appointed manager of the new Time and Job Standards department of the Stamford Div., Yale & Towne Mfg. Co. Prior to joining Yale & Towne, Mr. Brennan was vice-president of Smith, Brennan & Co.

• **Ira S. Latimer** has been appointed sales agent in eastern Michigan for the Heil Process Equipment Corp., Cleveland, with his office in Detroit. Mr. Latimer was formerly associated with Rotary Electric Steel Co. as metallurgical engineer, sales metallurgist and Chicago district manager.

• **Kenneth G. Donald** has been elected president of Jack & Heintz Precision Industries, Inc., Cleveland, succeeding **Byron C. Foy,** who has resigned as president and chairman of the board, the latter position being abolished. Mr. Donald continues as a vice-president of Robert Heller & Associates. He has been serving as general manager of Jack & Heintz for the past several months. Mr. Foy continues as a director of Jack & Heintz.

KENNETH G. DONALD, president, Jack & Heintz Precision Industries, Inc.

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• **Forrest E. Allen,** formerly a member of the faculty of Iowa State College has joined the development and research division of the International Nickel Co. Inc., New York, working on the company's educational program with universities and colleges in the United States.

• **Harold G. Williams,** formerly chief metallurgist of Instrument Specialties Co., has been appointed director of sales and engineering for H. Braun Tool & Instrument Co., Hawthorne, N. J.

• **Dallas S. Casley** has been named chief engineer of the Parkersburg, W. Va., plant of Penn Metal Co. Inc. Mr. Casley comes to Penn Metal from the engineering department of Ames Baldwin Wyoming Co.

• **H. S. Schaufus** has been named president, Phalanx Stainless Steel, Inc., Baltimore. Mr. Schaufus has formerly been associated with Eastern Stainless Steel Corp., Crucible Steel Co. of America and Rustless Iron & Steel Corp.

• **Dean W. Johnston** has been appointed manager of sales and distribution of Neptune-Power Plus Products Co., Detroit. **Elwyn Kaake** has been made chief engineer in charge of engineering and production. **Charles Billadeau** has been placed in charge of production of the electrical division; **Thomas Jones,** the armature wedge division; **Philipp Brod,** the plating division.

• **Milton Schor** has been appointed director of the research and development division of A. H. Wirz, Inc., Chester, Pa.

• **William C. Norvell** has been appointed manager of aviation sales for the Cleveland Lighting Div., Westinghouse Electric Corp., Pittsburgh. Mr. Norvell has been associated with Bendix Aviation Corp. and the Civil Aeronautics Administration.

• **Richard M. Galbreath,** chemical engineer, formerly with American Smeting & Refining Co., Salt Lake City, and Alton, Ill., announces that effective October 1 he becomes associated with his father, **M. D. Galbreath,** Galbreath Machinery Co., Pittsburgh.

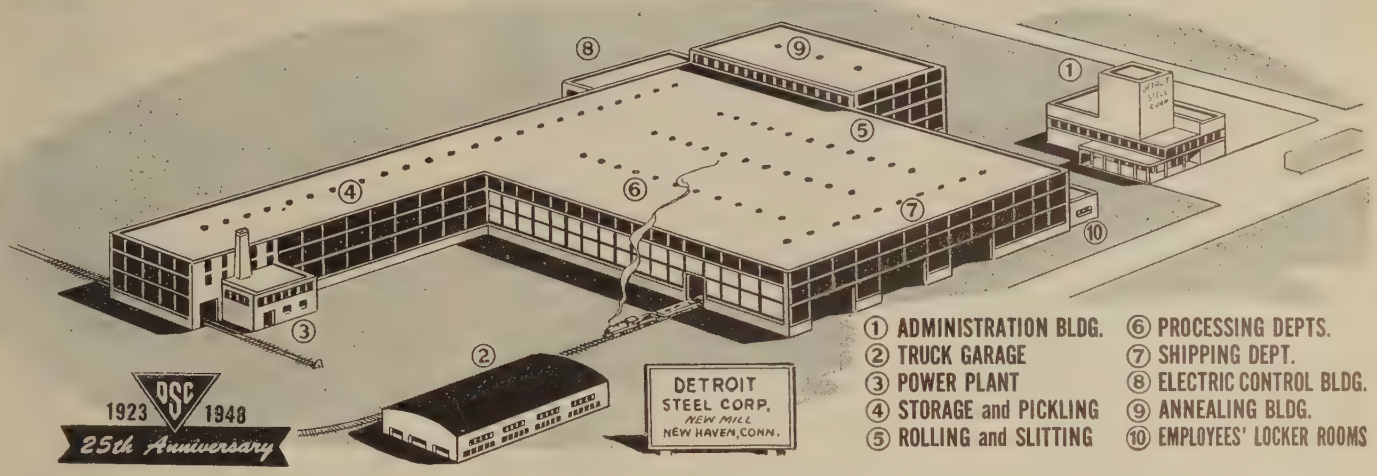
• **William A. Carlson** has been named vice-president in charge of manufacturing, Acme Pattern & Machine Co., Inc., Buffalo. **Robert E. Coleman** has been appointed vice-president in charge of sales. **Nelson M. Hopkins** has been appointed assistant to the president.

• **S. R. Zimmerman, Jr.,** has been named director of friction material research and development for Raybestos-Manhattan, Inc., Passaic, N. J. Mr. Zimmerman has been with the U. S. Asbestos Div. at Manheim, Pa. for 16 years and continues to make his office there.

• **Ross Hare** has been named manager of the electrochemicals department of E. I. du Pont de Nemours & Co., Inc., plant in Wilmington, succeeding **Dr. Newton C. Jones,** who died recently.

• **Raymond R. Rausch** has been elected a vice-president of General Electric Co., Schenectady, succeeding **Elmer D. Spicer,** who has retired.

# MORE STEEL COMING FOR DSC CUSTOMERS




*Sky-View Illustration of General Layout of Our New Eastern Plant*

## Here's How We're Going to Have More Steel for You . . . .

**Dependable Dan Our Customers' Man Invites Correspondence Regarding Your Normal and Regular Requirements**

Frankly, we may be unable to accept new business now, but looking ahead, we would like to keep you informed about our expanding facilities.

Now under construction . . . a big, new cold rolled strip mill in New Haven, Conn., scheduled to begin rolling by January 1, 1949 . . . to give Eastern customers 60,000 tons additional producing capacity . . . . practically at their stockroom doors.

Improvements at our Detroit Mill to step up that unit's producing capacity to 150,000 tons a year . . . to increase the supply of cold rolled strip available to Midwestern customers by about 35,000 tons a year.

### *And D.S.C. Reminds You . . . .*

That our Detroit mill . . . our Reliance Division network and our Craine-Schrage Steel Division will continue to do everything possible to keep your production rolling . . giving every account equitable consideration . . . constantly planning and working toward greater production and supply . . . and towards higher standards of steel service.

**DETROIT STEEL CORPORATION**

PRODUCERS OF COLD ROLLED STRIP STEEL

DETROIT 9, MICHIGAN

**RELIANCE STEEL DIVISION**

PROCESSORS AND DISTRIBUTORS OF JOB-FITTED SHEET AND STRIP STEEL

*General Office:* 1025 South Oakwood Ave., Detroit 25, Mich.
*Plants:* Chicago, Cleveland, Detroit; Lyndhurst, N. J., Worcester, Mass.
*Sales Offices:* Grand Rapids, Indianapolis, New Haven, Philadelphia, St. Louis, Toledo
*Products:* SHEETS—Hot Rolled . . . Hot Rolled Pickled . . . Cold Rolled . . . Long Terne . . . Galvanized; PLATES; COLD ROLLED STRIP STEEL—Coils and Cut Lengths . . . Slit or Round Edge . . . All Tempers.

★ ★

**CRAINE-SCHRAGE STEEL DIVISION**

DISTRIBUTORS AND DIRECT MILL REPRESENTATIVES

*Warehouse and General Office:* 8701 Epworth Blvd., Detroit 4, Mich.
*Sales Offices:* Grand Rapids, Toledo, Indianapolis
*Products:* Cold Drawn and Hot Rolled Carbon and Alloy Steel Bars . . . Tool Steels . . . Drill Rod . . . Wire Rope, etc.

• **Arthur E. Kimball,** Chicago zone sales manager for related products of Minnesota Mining & Mfg. Co., St. Paul, has been promoted to manager of development and sales for heavy grinding products in the company's coated abrasives division, with his headquarters in Chicago.

• **B. N. Brockman, Jr.** has been appointed advertising manager for R. K. LeBlond Machine Tool Co., Cincinnati, succeeding **Sidney R. Best** who has resigned to return to Perry-Brown, Inc.

• **George G. Ramsay,** vice-president and general manager of Lone Star Steel Co., has been appointed vice-president of operations with headquarters in Dallas. **William R. Bond,** formerly general superintendent of the Daingerfield plant, has been promoted to works manager.

• **John M. Hopwood** has been elected chairman of the board, the Hagan Corp., Pittsburgh. **D. J. Erikson** has been named president, succeeding Mr. Hopwood.

• **Leonard S. Florsheim** has been elected chairman of the board, Independent Pneumatic Tool Co., Chicago. **W. A. Nugent** has been named executive vice-president and **Dr. Walter G. McGuire,** chairman of the executive committee.

• **Robert W. Howard** has been appointed sales engineer for Pennsylvania, New York and New Jersey for Moore & White Co., Philadelphia.

• **Otto J. Hartwick** has been appointed technical director of the Houston paint division of Pittsburgh Plate Glass Co. Mr. Hartwick joined the company in 1926 and served in the Newark and Milwaukee plants prior to his transfer to the new Houston plant as chief chemist in 1941.

• **Edwin J. Heimer,** former president, Barrett-Cravens Co., Chicago, has joined Clapp & Poliak, Inc., exposition management, as vice-president in charge of their newly-opened San Francisco office.

• **James G. Miller** has been transferred to the Chicago office of Vanadium-Alloys Steel Co., Latrobe, Pa. Mr. Miller was previously employed as a representative in the St. Louis office.

VICTOR L. PERSBACKER, auditor, American Brake Shoe Co.

• **Victor L. Persbacker** has been appointed auditor of the American Brake Shoe Co., New York. In addition to his new duties, Mr. Persbacker continues to serve as assistant comptroller of the company.

• **Guy I. Swift** has been appointed assistant steel fabrication and assembly factory manager for Caterpillar Tractor Co., Peoria, Ill. He was formerly superintendent of third shift operations in the earth-moving equipment field. **Hubert Boggs** succeeds Mr. Swift in the latter position.

• **E. A. Watson,** manager of the Detroit branch of the Fruehauf Trailer Co., has been assigned to the national sales division and **D. B. Walter,** Detroit sales manager, promoted to his vacancy with **L. T. Criswell** succeeding Mr. Walter as sales manager. **James F. Duncan,** Dayton branch manager, has been transferred to Louisville to head the new factory branch there. **Victor Gross,** Fort Wayne, has been assigned to Mr. Duncan's post at Dayton. **Vance Howe,** Columbus manager, has joined Detroit headquarters as national accounts manager with **Roger Sullivan** promoted to Mr. Howe's Columbus vacancy. Erie branch salesman **John L. Crooks** has been named manager of that branch.

• **Jack R. Gregson** has been appointed district sales manager of the Bucket Dept. of Wellman Engineering Co., in the eastern territory, with headquarters in New York.

• **Paul R. Curtis, Jr.** has been appointed general sales manager of Plume & Atwood Mfg. Co., Waterbury, Conn. **Ernest C. Britton** has been named to the newly-created position of sales engineer.

• **Harold S. Swanson** has been appointed traffic manager of Chas. Williams & Associates, Ltd., New York. Mr. Swanson has formerly been associated with U. S. Steel Export Co.

• **L. A. Adams** has been made assistant to the vice-president and **A. S. Ault** has been made manager, sales and service, Chicago Vitreous Enamel Product Co., Cicero, Ill.

• **R. W. Duncan** has been promoted to works manager, Crosley Shelvador Refrigerator Plant, Richmond, Indiana, a division of Avco Mfg. Corp. Mr. Duncan joined the Crosley organization in Cincinnati in 1941. For the past several months he has been assistant works manager and since 1945, chief process engineer.

• **George F. Mueller** has been elected assistant secretary of Fansteel Metallurgical Corp., North Chicago, Ill. Mr. Mueller also serves the corporation as house patent attorney.

• **Harry Berg** has been made manager of the newly-acquired Athens, Ohio plant of the McBee Co.

• **John J. Wyle** has been appointed plant purchasing agent of the Topeka, Kan. plant of Goodyear Tire & Rubber Co., succeeding **C. W. Gilchrist,** who has resigned.

• **G. D. Spackman,** vice-president in charge of operations of Lukens Steel Co., Coatesville, Pa., has been elected a member of the board of directors of E. & G. Brooke Iron Co., and of Richard Ore Co., Birdsboro, Pa., to fill the vacancies created by the resignation of **Robert W. Wolcott,** president of Lukens, who had been a member of both boards.

• **Morrison H. Watkins** has been appointed controller of Oklahoma Steel Castings Co., the FitzSimons Steel Co. and A. D. Cook, Inc., operating subsidiaries of American Steel & Pump Corp., with his headquarters in New York.

J. F. GINNA, assistant to the vice-president in charge of production, American Car & Foundry Co.

• **J. F. Ginna** has been appointed assistant to the vice-president in charge of production, American Car & Foundry Co., New York. Mr. Ginna has been associated with ACF for over 30 years.

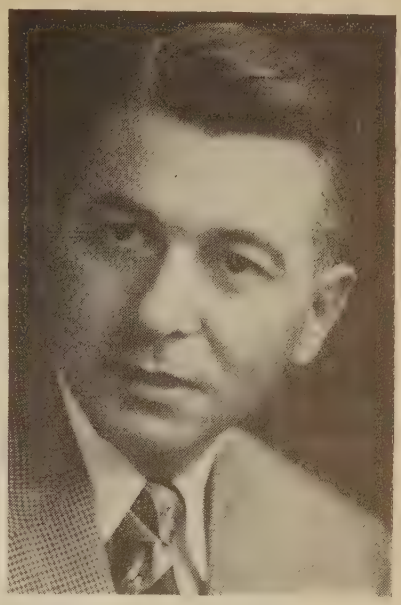
• **William J. Hopkins** has been appointed eastern division manager for the renewal tube sales department, Radio Tube Div., Sylvania Electric Products Co., New York, with headquarters in Baltimore. **Erwin A. Larson** has been named distributor sales representative for that department of the Radio Tube Div. in metropolitan New York. **John T. Lucas** has been appointed supervisor of quality control and customer service for the Huntington Radio Tube plant. Mr. Lucas was formerly supervisor of product engineering at the company's Altoona plant.

• **John W. Hill** has been appointed general superintendent of U. S. Vanadium Corp.'s operations in the Colorado area, with full charge of operations at Uravan and Rifle. Administrative offices are located at Grand Junction. Mr. Hill has been with the corporation since 1936. **David D. Baker** has been made manager of tungsten operations at Bishop, Calif. and at Henderson and Winnemucca, Nevada. Administrative offices are located at Bishop. Mr. Baker joined the firm in 1939.

• **Dr. Donald H. McLaughlin,** president of Homestake Mining Co., has been elected a director of the International Nickel Co. of Canada, Ltd., filling the vacancy caused by the death of **William N. Cromwell,** a former member of the firm of Sullivan & Cromwell.

• **J. C. Cravens, Roderick Steward** and **J. R. McComb** have been added to the agricultural chemical sales staff of Dow Chemical Co., Midland, Mich. **Dr. J. C. McDonald** has been made manager of the technical service department. John White has been named manager of magnesium sales in the Boston territory.

• **H. R. Butts** has been named general sales manager, Wire Div., Electric Auto-Lite Co., Toledo, succeeding **Verne F. Dobbins** who has retired. Mr. Butts has his headquarters in Port Huron, Mich. **Max H. Smith** has been appointed to succeed Mr. Butts as southern division manager and **Fred Vanzo,** central division district supervisor, has been brought from Chicago to replace Mr. Smith in Toledo.



JOSEPH W. FARLEY, manager of sales, McConway & Torley Corp.

• **Joseph W. Farley** has been appointed manager of sales, miscellaneous steel castings, for McConway & Torley Corp., Pittsburgh. Prior to joining McConway & Torley, Mr. Farley served as sales engineer with Chester Electric Steel Co., Fort Pitt Steel Castings Co. and Lobdell Co. In his new position, Mr. Farley also heads that sales activity for the firm's Pittsburgh plant and for its subsidiary, the Baltimore Foundry & Machine Co. of Baltimore.

• **S. C. Lawson,** assistant general sales manager of Ampco Metal, Inc., Milwaukee, has been appointed general sales manager, succeeding R. J. Thompson. **J. P. Henry** has been named assistant general sales manager, succeeding Mr. Lawson. Mr. Henry has been serving as eastern zone manager with headquarters in Hartford.

# OBITUARY...

• **Forrest Rutherford,** 67, Washington representative of the Republic Steel Co., died Sept. 13.

• **W. T. Ryan,** 64, consulting engineer for the Steubenville works of Wheeling Steel Corp., died recently.

• **William Tann,** founder and president of Congress Tool & Die Co., Detroit, died Sept. 15.

• **Henry J. Litsey,** 57, general superintendent of the Ambridge, Pa., plant, Spang-Chalfant Div., National Supply Co., died Sept. 16.

• **Aldus C. Higgins,** 75, chairman of the executive committee and formerly president, general manager and chairman of the board, Norton Co., Worcester, died Sept. 11.

• **Frederick C. Gifford,** former executive and director, Acme Steel Co., Chicago, died Sept. 4.

• **L. S. Austin,** 57, civil engineer for Woodward Iron Co., Birmingham, died recently.

• **Selbert M. Johnson,** 53, former president of the Jamestown Electro Plating Works, Jamestown, N. Y., died recently.

• **Elmer C. Nation,** vice-president of Sylvania Industrial Corp. of Georgia and branch manager of the Atlanta office of Sylvania Div., American Viscose Corp., died recently.

• **Eugene A. Ford,** 82, engineer and inventor, International Business Machines, Binghamton, died Sept. 4.

# European Letter . . .

**• Hollowness of British Socialist doctrine and solidity of labor movement demonstrated at Trades Union Congress . . . Before acceptable to the public, nationalization must further show its economic efficiency to industry.**

LONDON—The Trades Union Congress at Margate may have demonstrated the solidity of the British Labor movement. But it also demonstrated the hollowness of Socialist doctrine. Socialism, in Britain at least, long since ceased to be a device for equalizing wealth by confiscating property. Sir Stafford Cripps told the trade unionists that they could no longer hope to equalize wealth by raising wages at the expense of profits. And the Congress itself voted against the principle of workers' control of industry. If a Socialist is not a man who believes in confiscating wealth, who does not believe that the national income can be substantially redistributed in favor of wages, who does not believe in workers' control of industry, what then is he? Perhaps the most accurate answer, so far at least as this country is concerned, is to say that a Socialist is a man who believes in the nationalization of industry, or at least of some industries, but who has abandoned all the original reasons for that doctrine and is therefore dependent on a number of *ex post facta* rationalizations for what has long ago become an irrational instinct.

For example, the doctrine that an industry or service which provides a common service for industry generally or is basic in character, should be socialized clearly rests on the assumption that the state can far better protect the public interest in such a basic industry than anyone else. Indeed, in most Socialist thinking and writing the state is simply equated with the public interest. There are of course cases in which the state is the only effective protector and organizer of the public interest. In wartime, for example, and, to a large extent, in a postwar siege economy the state alone has the reach and the power to insure the public interest. But as a general proposition for permanent and universal application, it certainly cannot be accepted that the state always acts in the public interest. It is far nearer the truth to say that the state merely consists of a number of government departments, each of which tends to put its own interests above those of the public. No one would dream of asserting that the state's interest and the public interest are identical where the civil and political rights of the individual citizen are concerned. Indeed, the history of freedom is one long list of devices, from trial by jury and *habeas corpus* to the judges' rules of evidence, based on the assumption that the state can *not* be trusted to serve the public interest. No one would advocate dismantling these defenses of justice simply because the executive organs of government are nowadays responsible to a democratically elected parliament. Yet in economic matters the doctrine appears to be accepted that whatever a Minister of the Crown may take it into his head to do is *ipso facto* in the public interest.

*Reprinted from The London Economist by special permission.—Ed.*

THERE really is no evidence for any such naively trusting view. Indeed, evidence is beginning to accumulate for the directly contrary view. For what is the overwhelming public interest in an industry, the more overwhelming, the more basic, the industry? Clearly that it should be conducted with the maximum economic efficiency. What does the public require of transport, or of electricity, or of steel? That they should render their services, or produce their materials, as cheaply as is possible without exploiting their labor or undermaintaining their capital. There is no other public interest that comes within a hundred miles of this in importance. Now what reason is there for believing that the public ownership of these industries and services will lead to their rendering their services or producing their materials more cheaply? In specific cases there may be good reason for so believing. But if what is sought is not specific judgments on the merits of particular industries but a sweeping generalization of universal application, then it can only be said that nationalization will generally lower the economic efficiency of an industry. There are three reasons for saying this. The first is that a nationalized industry, being a political structure, will almost certainly be cumbrous and slow moving; of that there is already evidence. The second is that a nationalized industry will almost certainly be far too weak in its relations with the unions; it will tend to grant too much pay for too little work and recoup itself by putting up its charges, that is, at the expense of the public interest. Of this, too, there is also now plenty of evidence. And thirdly, a nationalized industry is inevitably more of a monopoly, and much more protected in its exercise of monopoly powers, than what it replaces. Nationalization will pay if it can be shown that there are some *strategic* gain to be secured through public ownership large enough to outweigh the inevitable *tactical* losses of a cumbrous and vulnerable form of industrial organization. In the case of coal, most people were finally convinced by the Reid Report that there was such a strategic gain to be had through a thorough concentration of the industry, which its private owners could not and would not undertake. In electricity there are technical reasons for expecting real economies from a concentration of ownership. In transport, a theo-

(CONTINUED ON PAGE 109)

# What happens to your drawings?

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Place your drawing on any one of the many Ozalid sensitized materials, feed it into the Ozalid machine, and you will have a positive (not negative) copy, dry-developed and ready to use, in a matter of seconds!

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Instead of altering or changing your original, do it on a translucent Ozalid print. You can then combine as many changed prints as you wish by putting them on transparent Ozalid film, overlaying them on a sheet of Ozalid sensitized paper, and processing!

## Do you want drawings on different weight papers?

Ozalid papers are available in light, standard, and heavy weights. You can even make Ozaprints with reproductions on both sides of the sheet!

## Do you want color coded drawings?

Reproduce your drawings on Ozalid papers in black, blue, red or sepia on white or tinted backgrounds. Color code prints for different departments . . . color code different circuits, dissimilar lines or symbols, etc. for greater clarity.

## Do you need extra masters?

Make translucent Ozalid Intermediates directly from your tracings for use as "masters" in your printmaking. This saves the original . . . provides "masters" for different departments, branches, contractors, etc. (Ozalid Intermediates are actually better to print from than originals. They increase line density; can be made on new Ozalid plastic surfaces, impervious to stain and smudge.)

If you make drawings—or use them—Ozalid can save you time and money. Write today, and learn more about *how* Ozalid can tighten up lost time and money in your field.

## ALL OZALID PRINTS PRODUCED IN SAME MANNER

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★ **Your drawings can be up to 42 inches wide, any length. Roll stock or cut sheets can be used. (Special machines accommodate 54″ wide drawings.)**

★ **You—or anyone else—can be the operator. A few hours and you're an "expert."**

★ **See *all* the Ozalid prints you make from any drawing . . . and learn full story. Mail coupon today.**

DEPT. NO. 177

**OZALID** A Division of General Aniline & Film Corp., Johnson City, New York

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# Industrial News Summary...

- **Rail Rates Worry Shippers**
- **Steel Output Record Seen**
- **Ingot Rate Up to 96.5 Pct**

MAYBE the railroads can't help it but it looks as if they are trying to price themselves out of a large chunk of the iron and steel business. Since they have said they will seek higher rates on finished steel, steel companies are placing more emphasis on other means of transportation.

If the Interstate Commerce Commission allows the 8 pct increase now sought by the railroads the rate for moving the bulk of the nation's iron and steel products will be about 70 pct above the prewar level. Steel company traffic managers are obligated to help route steel the cheapest way even though the customer pays the freight.

They are using every means possible to find ways other than railroads to transport a larger and larger part of steel shipments. Steel buyers also will be forced to give closer study to this and to relocating their plants. Truck shipments in several areas are increasing by leaps and bounds. Barges are certain to haul more steel as time goes on.

The increase asked in freight rates for coal and iron ore will put on pressure for higher steel prices. Steel companies faced with higher raw material costs may pass on the increase which will amount to as much as $1 a ton on finished steel. If this is passed on it will be in addition to what the steel user will pay if higher rates for finished steel are okayed.

Soaring rail rates—and no provision has been made yet in case higher wages are granted to rail workers—have made the f.o.b. mill sales question academic in some sections of the country. If rail rates continue their upward trend there is no chance of a return to general freight absorption for competitive purposes even if it is allowed by law. No steel firm could afford it. Where a mill would have to absorb $8 to $10 a ton to meet competition it would not do it on most products—law or no law.

THERE are still areas where absorption would be just a few dollars a ton and where competition would exist if the law allowed. But every rail rate increase cuts down such an area and brings it closer to the mill's own backyard.

Substantial steel buyers are showing more interest now than they have for some time in the prospects of locating plants near Pittsburgh district mills. Well established firms can expect to get steel as soon as they set up shop in that area. They are not thinking of moving just to get steel—that would be stupid unless they have good future prospects. But they are wondering if this is not the time to establish plants there while they have the money to do so. Some realize that on the basis of current steel transportation costs they'll be unable to stay alive at their present locations in a highly competitive market. And those costs appear to be going up.

Chances are excellent that the steel industry will break an all-time record this year in finished steel output. THE IRON AGE estimates that more than 64 million tons of finished steel will be produced this year—an increase of 85 pct over 1939 and more than was produced in the peak year of 1944.

Steel ingot production will approach 88 million tons this year—about 1½ million tons less than 1944, an all-time record. But ingot output is no longer the real story. Finished steel output tells more. A greater part of the steel ingot is finding its way into finished steel products. That's why this year will be a banner one and next year a super dooper.

PART of the credit for the increased percentage of the ingot going into finished steel belongs to the converter. Had it not been for large and small companies which bought ingots and took them elsewhere for conversion into finished steel items, less steel would have been available. Conversion is now a big business. It has shown how available equipment in one area can process products from other districts.

Furnaces now on order, being modernized or in the planning stage, will add at least 750,000 tons to electric furnace annual steel capacity before the end of 1949. Most, if not all, of this new equipment will begin melting low carbon steels. It will add about 14 pct to the nation's electric furnace capacity before the end of next year if, as appears likely, no other furnaces are taken off.

Use of electric furnaces for melting low carbon steel is an evolution in steel-making that has mushroomed since the war. Like any expansion of steel ingot capacity it poses a question of where the scrap will come from.

There is no slackening in demand anywhere. Some large steel buyers are so wrought up over the possible breakdown of voluntary allocations that they are increasing their conversion deals—where possible. Some of these buyers privately see a nightmare of priorities coming. They are preparing for that day by searching every nook and cranny for steel that can be converted to finished steel products. This will continue for many a month.

Steel ingot output this week is up half a point to 96.5 pct of capacity. This is the highest rate since before the coal strike. A continuation of this high level is expected.

• **MORE STEEL CAPACITY** — In cooperation with a group of customers who are finding it increasingly difficult to keep their plants running in face of the steel shortage, Allegheny Ludlum Steel Corp. is installing additional steelmaking facilities at its Brackenridge, Pa., plant. The new facilities comprise two 70-ton electric melting furnaces, one 60-ton melting furnace, soaking pits and auxiliary equipment. Installation of these facilities is scheduled for completion by the second quarter of 1949. The 60-ton melting furnace is being rebuilt and leased from the navy. This additional capacity could make A-L less dependent on outside semifinished steel purchases.

• **SCRAP HEARING DUE**—Stalemate between U. S. and Britain over the price of German scrap is due to be aired in a congressional hearing. Rep. Macy, R., N. Y., says thousands of tons of U. S.-bound scrap are embargoed on German docks because of failure of the two nations to agree on a price. "We should bring this surplus German scrap within our control without delay to prevent possible acquisition by an aggressor nation," Macy declared this week. Meanwhile, Britain has latched on to 800,000 tons and is continuing to remove approximately 3000 tons per day.

• **ACQUISITION**—Rotary Electric Steel Co. has purchased from War Assets Administration the DPC facilities that were erected on company property during the war. The purchase price was $250,000 and the property consists of six buildings with a total floor area of 56,200 sq. ft. The structures include a hot metal and scrap storage building, a chipping building and briquetting building, also a crusher building, cupola building and switch house.

• **PIPE MILL**—Construction of Youngstown Sheet and Tube's new continuous Butweld pipe mill at Indiana Harbor will be started very soon. The new mill will make pipe up to 4½ in. outside diam and will be capable of producing 120,000 to 150,000 net tons of products per year. Extensive changes will be made by the company in both the blooming mill and the 10-in. skelp mill in order to furnish raw products for the new pipe mill. The program also requires doubling the capacity of the galvanizing plant and extensive improvement and enlargement of the present finishing mill.

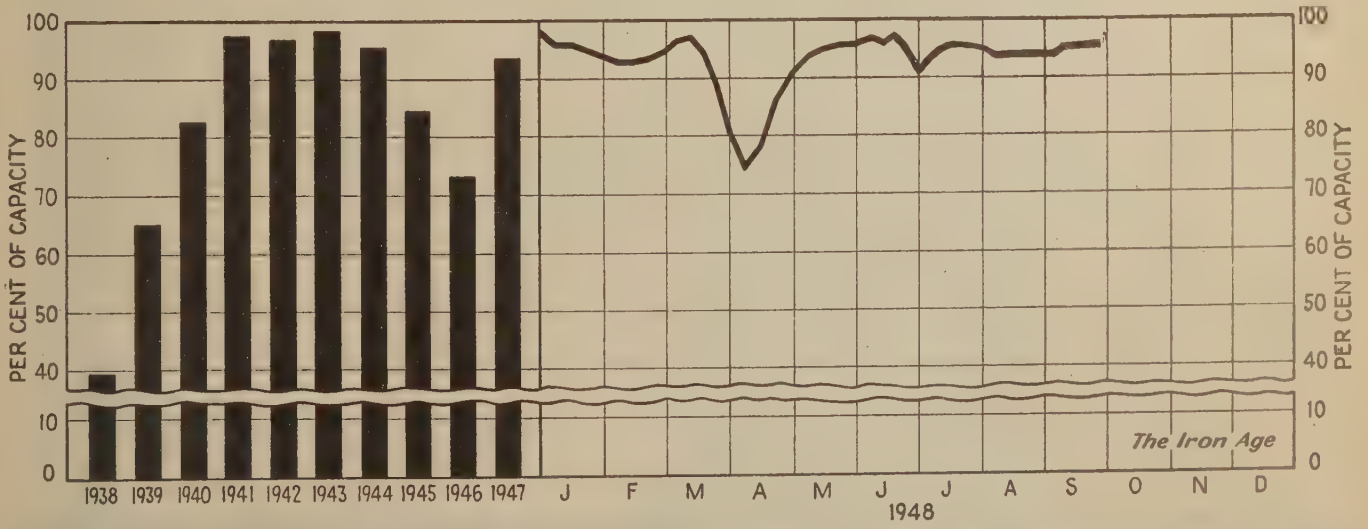
• **INLAND APPEALS**—Inland Steel Co. declares that it will appeal the decision handed down by the U. S. Circuit Court of Appeals which upheld the validity of the NLRB order requiring the company to bargain with the USWA, CIO over provisions of the company's pension plan. The company holds that bargaining on the pension plan is optional. In the same decision the court held that the union officials must comply with non-Communist affidavit requirements of the Taft-Hartley Act in order to qualify for benefits of the act.

• **ORE CONSUMPTION**—Consumption of Lake Superior iron ore amounted to 7,036,135 gross tons during August. This was the most ore consumed during any month since January, the Lake Superior Iron Ore Assn. said. The gain was partly the result of newly installed furnaces at plants of the U. S. Steel Corp. in South Chicago and Lorain, O., and at the factory of the Pittsburgh Steel Co. in Monessen, Pa. Resumption of operations by the Wheeling Steel Corp. at Steubenville, O., and the Wickwire-Spencer Div. of Colorado Fuel & Iron Corp. at X-Furnace, Buffalo, also helped to increase consumption.

• **PIG IRON PRICE INCREASE**—Bethlehem Steel Co. has put into effect a price increase of $4.00 a ton on all grades of pig iron produced at Steelton and Bethlehem effective Sept. 14.

• **FERROMANGANESE INCREASE**—On Oct. 1, most producers of ferromanganese are raising their prices. E. J. Lavino & Co., Philadelphia, will charge $160 a gross ton, f.o.b. Sheridan, Lebanon County, Pa. Sloss-Sheffield will charge $162, f.o.b. Birmingham. Electro Metallurgical Sales Co. will charge $160, f.o.b. Niagara Falls, Alloy, W. Va. and Welland, Ont. No information is yet available on what action will be taken, if any, by the U. S. Steel Corp. or Bethlehem Steel Co. Tennessee Products Corp. has already put into effect a price of $165, f.o.b. Rockwood, Tenn. However, this producer plans to discontinue ferromanganese production after the first of the year and will use its furnace for the production of foundry pig iron.

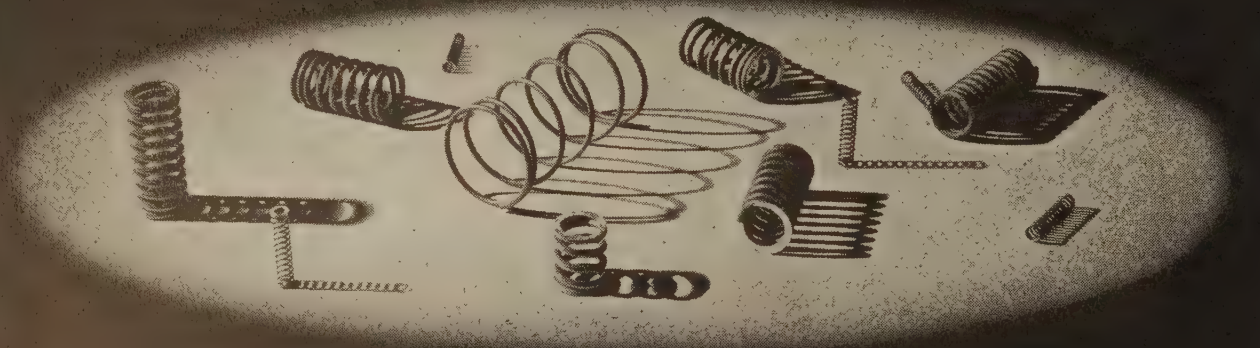
## *Steel Ingot Production by Districts and Per Cent of Capacity*




| Week of | Pittsburgh | Chicago | Youngstown | Philadelphia | Cleveland | Buffalo | Wheeling | South | Detroit | West | Ohio River | St. Louis | East | Aggregate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sept. 21 | 97.5 | 95.0* | 92.0 | 87.0 | 96.5* | 105.0 | 100.0 | 102.0 | 101.0 | 86.0 | 110.0 | 91.5 | 98.0 | 96.0 |
| Sept. 28 | 98.0 | 97.0 | 92.0 | 87.0 | 96.0 | 105.0 | 100.0 | 102.0 | 102.0 | 84.0 | 110.0 | 91.5 | 112.0 | 96.5 |

* Revised.

# Grinding Springs?



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**NORTON ABRASIVES**

# New Electric Furnaces Will Add 600,000 Tons To 1949 Capacity

## Present Plans Call For All New Units to Start by Melting Low Carbon Steels

o o o

By GEORGE F. SULLIVAN
*Pittsburgh Regional Editor*

o o o

***Pittsburgh***

• • • **Steel plant** electric furnaces now on order will be able to turn out over 600,000 tons of carbon steel annually. Modernization of some present furnaces will add at least another 50,000 tons a year to this figure. None of these new furnaces will replace existing units, at least in the immediate future.

This means that before the end of 1949 electric furnace capacity in the country will be boosted by about 12 pct. It assumes no scrapping of any large units currently producing. But it does not take account of several large electric furnaces now in the planning or inquiry stage which would add over 150,000 tons to these figures. And it leaves a question mark: Where will the good quality scrap come from?

Without exception, all the steel plant electric furnaces now on order will start making low carbon steels. This is a sharp departure from prewar practice. Since the end of the war steel companies have materially increased the proportion of carbon steels—as against alloy steels—made in the electric furnace.

The accompanying table of electric furnace ingot production tells the story. It should be qualified by the knowledge that high carbon steels are included under "carbon," there being no figures available to separate them. It is believed, however, that much of the difference between prewar and postwar carbon steel percentages is accounted for by an increase in the proportions of low carbon steel made in the electric furnace.

Cost is an important factor in this new thinking, cost and speed. An electric furnace shop can be set up far faster than an openhearth installation of comparable ingot capacity. And for the amount of available capacity the capital investment and carrying charges are lower than for any other steelmaking method. Shop buildings are less expensive too and can be erected faster.

The need to boost ingot capacity quickly to meet a demand that is strong today but may dip tomorrow is believed to have influenced some of the recent purchases. Uncertainty of future costs is also said to be a factor because installation time is shorter.

Specific electric furnace cost figures on melting carbon steel from a cold charge are not available for publication now. But those who make and sell steel plant electric furnaces assert with considerable force that their units can produce carbon steel at costs comparable to the moderate sized openhearth that uses liquid fuel to melt cold scrap and pig iron. They have seen the cost figures.

They are careful to qualify their claim by the cold-charge comparison. They do not assert that an electric furnace can compete on cost with a modern openhearth where hot metal and cold scrap are charged.

But even the present claims

"... Doncha Help That Bear"

would have been scoffed at before the war when with a few exceptions the electric furnace was considered a vehicle for alloy steel production only. Since then openhearth metallurgical practices have been carried over to the electric furnace shop and voltages increased to reduce melting time. Furnaces have been improved to allow faster charging.

A few weeks ago a prominent oil company official declared that increasing costs of producing oil fuel are bringing it to a point where coal is becoming competitive. Cost of electric power (generated from coal in most industrial areas) has been rising gradually while fuel oil price increases have been substantial. The trend tends to bring electric furnace operating costs closer to those of oil-fired openhearths.

**How long** electric furnace expansion — or any ingot capacity expansion for that matter — can continue at current rates is hard to answer in view of prospects of a long term scrap shortage in this country. These new electric furnaces alone will be in the market for about 600,000 additional tons of scrap annually.

Though high grade scrap is normally associated with electric furnace operation the shoe also fits the other foot. The association came because electric furnaces were once used almost entirely for alloy steels only. On carbon steel electric furnaces can, and today are using some scrap too light for an openhearth. This is important now and for the future because increasing emphasis on sheet steel output is yielding lighter scrap. Heavy scrap is on the downgrade. It is estimated that melting loss due to oxidation is 2 to 4 pct less in the electric furnace than in the openhearth.

Some of the new furnaces will be located in areas that produce more steel scrap than neighboring mills consume. Rising freight rates have accentuated the problem of returning customer scrap to the steel supplier. Location of electric furnaces in scrap-plus areas like Detroit would assure them of more and better grade charging material at lower average prices than those paid by furnace operators in scrap-minus areas like Pittsburgh.

Generally speaking, scrap is in tight supply today. Good quality scrap is hard to get and the more furnaces there are to feed the tighter it will become. Many sections of the country need more central station equipment to boost power supply. These are two limiting factors that face prospective furnace operators. Another is the electrode shortage. But within these limits is an evolution in steelmaking. It is not small. For it steel companies will spend at least $15 million in 1948 and 1949.

## Government Sues Alcoa, Asks Cut in Size, Power

*New York*

• • • **The Justice Dept.** filed proceedings on Sept. 24 in the U. S. District Court here in an effort to force Aluminum Co. of America "to reduce its power and size." The proceedings are an effort to carry out a monopoly judgment obtained against Alcoa in 1945. It was made clear the Justice Dept. does not intend to try to put Alcoa out of business. The desire is to "neutralize monopoly power and establish conditions in which competition can take place," according to Attorney General Tom C. Clark. This would apparently mean disposal of some Alcoa facilities if the government were successful.

The government originally made its charge in 1937 here but the court dismissed the federal complaint which was then carried to the Supreme Court. There four judges disqualified themselves and in 1945 a special three-judge court finally decided in favor of the government. Some 18 months ago Alcoa asked that the anti-trust litigation be dismissed, pointing out that competitive conditions in the industry had changed substantially since the original action was filed.

•

## Alcoa's Answer

*Pittsburgh*

• • • **Roy A. Hunt,** president of Aluminum Co. of America, branded the Justice Dept.'s effort to enforce a 1945 anti-monopoly judgment against the company as "pure election-year politics."

Competition obviously exists in the industry today, Mr. Hunt declared. Commenting on Alcoa's petition to dismiss the antitrust suit, he pointed out that more than a year ago a date for a trial to wind up the action was set by agreement with the Justice Dept.

"Notwithstanding this agreement, the department has successfuly resisted a trial by resorting to a variety of maneuvers which had the effect of delay. Now, after dragging its feet for 18 months and resorting to every available legal device to avoid a trial, it suddenly becomes apparent to the department on the eve of the elections to revive and renew these old monopoly charges, although the department for the last 18 months has blocked the trial."

Since the case cannot be reached before election, he charged that the "timing of the petition is transparent and reflects no credit upon those responsible for it. The filing of the suit at this time is pure election year politics."

"The government has leased or sold aluminum plants to Alcoa's competitors on very liberal terms,"

### ELECTRIC FURNACE STEEL PRODUCTION

Ingots and Steel For Castings, Net Tons

| Years | Alloy | Carbon | Total | Per Cent Carbon to Total |
|---|---|---|---|---|
| 1938 | 372,372 | 193,255 | 565,627 | 34.2 |
| 1939 | 749,384 | 279,683 | 1,029,067 | 27.2 |
| 1940 | 1,286,716 | 413,290 | 1,700,006 | 24.3 |
| 1946 | 1,635,827 | 927,197 | 2,563,024 | 36.2 |
| 1947 | 1,778,937 | 2,008,798 | 3,787,735 | 53.0 |
| 1948* | 1,322,322 | 1,854,602 | 3,176,924 | 58.4 |
| Aug. '48 | 174,384 | 260,862 | 435,246 | 59.9 |

*Source: American Iron & Steel Institute Compilation:* THE IRON AGE.

* 8 months.

Mr. Hunt continued, and these competitors now control "fully one-half of the aluminum ingot market of the United States."

"We welcome the chance, long withheld, to meet these charges in court, but we regret that the department chose a timing which inevitably injected them into the political campaign," Mr. Hunt concluded.

## German Production Rises

*Berlin*

• • • **Western Germany**'s iron and steel production set another postwar record in August, according to the American Military Government here.

The biggest gain was in steel ingot output which reached 510,000 metric tons. This was 12 pct over the previous month's production and 28 pct over last year's August figure.

Pig iron production rose to 433,500 tons, a gain of 8 pct over July, while rolled steel products rose 8 pct also, to 344,500 tons.

## Entertains Foremen's Club

*Youngstown*

• • • **Youngstown Sheet & Tube Co.** entertained about 450 members of the Foremen's Club of Toledo, Ohio, at its Campbell plant, Oct. 2. Foremen came to Youngstown on a special 12-car train which was switched into the steel plant yards, arriving about 10 a.m.

The plant tour included visits to the openhearth department, the blooming mill, the hot and cold strip departments and the seamless tube mills. The visitors were shown how steel is made in the openhearth department and saw the various finishing processes for sheets and strip steel and for pipe.

## More Navy Yard Workers

*Boston*

• • • **The Boston** Navy Yard has been authorized to increase its working force from its present 10,150 employees, the Navy Department has announced. The authorization is in accordance with a general increase in working forces in line with the defense program. No new figures were given on the possible increase.

# Industrial Briefs . . .

• ELECTRODE PLANT — Announcement has been made by National Carbon Co., Inc., of its intention to build a new graphite electrode plant. Construction will be started as soon as plans are completed and technical equipment secured, so that the factory can be placed in operation at the earliest possible date.

• CHANGE OF ADDRESS — The Tinius Olsen Testing Machine Co. has announced that they are now located in their new offices and plant on Easton Road, Willow Grove, Pa.

• PLANT FOR SALE—WAA Real Property Office, Navy Pier, Chicago, will accept sealed bids up until Oct. 9 on a war surplus plant located in Detroit which is suitable for a machine shop or most small types of general manufacturing. The one-story steel-concrete building contains approximately 32,500 sq ft of floor space. The property includes 4/5 of an acre of land. The miscellaneous equipment includes machine tools, shelving, benches, files and hoists and may be purchased "as is, where is" with the right of resale.

• CENTENNIAL—The American Locomotive Co. plant at Schenectady this week observed its one hundredth anniversary of locomotive building.

• INSTITUTIONAL DAY — Production of the 300,000th postwar Willys-Overland vehicle at Toledo highlighted preparations for the company's third annual Institutional Day to be observed Oct. 6. Visitors will be shown new models to be introduced in the near future and their complete line of cars will be demonstrated in action.

• CANADIAN AGENT — The appointment of John Best & Associates, Toronto, as distributor in Canada for Buckeye portable air and electric tools has been announced by Buckeye Tools Corp., Dayton.

• MANAGEMENT GROUP — Gray iron foundry management executives in Kansas and Oklahoma, meeting at Wichita, launched a Management Executives' Group of Gray Iron Founders' Society with plans to meet monthly. The following officers were elected: Chairman, Joseph Z. Warren, Western Iron & Foundry Co., Wichita; vice-chairman, Fred E. Fogg, Acme Foundry & Machine Co., Coffeyville; secretary-treasurer, Frank R. Westwood, Service Foundry, Inc., Wichita.

• EXPORT AGENT — The Tyson Bearing Corp., Massillon, Ohio, manufacturers of the All Rolls design tapered roller bearing, has appointed R. A. Rodriquez, Inc., 55 W. 42nd St., New York, as export representative for all foreign countries except Canada.

• NEW COMPANY — Announcement has been made of the organization of Hanchett Magna-Lock Corp., Big Rapids, Mich., to continue the line of magnetic chucks formerly produced by Hanchett Mfg. Co., Big Rapids. Officers of the new company are J. F. Manting, president; D. D. Stone, vice-president and treasurer, and R. V. Hanchett, secretary.

• ALL-WELDED BUILDING — A new mechanical engineering building of all-welded design is being completed by Fenn College of Cleveland as a part of their long range expansion program. In 5 days the building was completely erected and readied for welding and two welders then welded the entire building in 10 days.

• MOVING — Construction of its new building being completed, the Houston branch of the Foxboro Co., Foxboro, Mass., will move on Oct. 15 to 2518 South Boulevard, Houston. The company manufactures industrial instruments, control valves and similar equipment.

## Legal Advice, No More No Less, Is Cause For Ending Allocated Sales

*New York*

• • • **The New York** Central R.R. Co. recently abandoned selling substantial tonnages of railroad scrap in the Cleveland, Youngstown and Buffalo areas on an earmarked or allocated basis.

Rumors persisting at the time attributed the move to either a recent ICC ruling or legal interpretation of sections of the Robinson-Patman Act so as to make the company liable for suit under unfair trade practices.

When contacted for particulars concerning the change in practice, a company spokesman informed THE IRON AGE that "the change was made under advisement by the company's legal department—no more, no less—and that no ICC ruling nor any section of the Robinson-Patman Act affected the decision in any way.

"We are not trying to set a precedent for other companies to follow nor are we interested in the least what method of selling they pursue. We are merely acting on our own legal department's advice," he added.

The spokesman went on to say that smaller companies had been selling on an open market for years and that even large companies had never sold on an earmarked basis in the small consuming areas.

When questioned about the possible effects such a change would have on the price structure of rail scrap in the heavy consuming areas, the spokesman stated that he did not think the company's change in policy would have any effect whatsoever on the market.

**Considerable** speculation continues to exist, however, as to whether existing rail scrap prices will hold in the affected areas. Earmarked scrap generally moves at the lower prices of quoted ranges for various grades. It generally represents the bulk of shipments. Only smaller tonnages move on the open market or the higher prices of the quoted range.

New York Central's abandonment of the earmarked basis of selling in Cleveland, Youngstown and Buffalo, in particular, will throw large tonnages of rail scrap on the open market or peddling basis where scrap goes to the highest bidder.

Prior to this move rail scrap showed a weakening tendency in Cleveland. The move immediately injected a strengthening tone to the market in that area. It is difficult to visualize substantial tonnages going at open market levels for any length of time and still not affecting the existing price levels.

To date, none of the other major railroads have shown any disposition toward abandoning the method of selling substantial tonnages of scrap that has been in vogue for years. At least one company, however, has been working overtime trying to determine any legal reasoning behind New York Central's move as a protective measure. But thus far has found nothing to indicate that selling on an earmarked basis is illegal.

## 50 YEARS AGO

THE IRON AGE, *September 28, 1898*

• "In 1884 manganese steel was discovered by the Hadfields of Sheffield, England. The discovery of a metal with such extraordinary properties started metallurgists experimenting to see if they could discover a steel or alloy with higher physical properties. This research has resulted in the discovery of some valuable steels, notably those containing molybdenum and vanadium but nothing equalling manganese steel in combined hardness and toughness has yet been produced."

• **"A plant for the separation of tin from scrap tinplate will shortly be in operation in this country and a new American industry will thus be initiated. Parties who for some time have successfully operated a tin scrap reduction works in Germany under a German process will proceed with the erection of a similar plant near Perth Amboy, N. J."**

• "R. D. Wood Co. of Philadelphia was awarded a contract for 995 tons of cast iron pipe by the Glasgow Corp., after vigorous competitive bidding between Scottish and American firms."

• **"After 2 years of experimenting on electric riveting machines, an Englishman has finally succeeded in bringing out a type quite capable of superseding hydraulic and pneumatic riveting. He states his machine in production has closed 1200 rivets per 10 hr day with the attendance of only three men and a boy."**

• "Waterbury Farrel Foundry & Machine Co. of Waterbury, Conn., has produced two new small mills for rolling sheet metal. They are provided with tight and loose pulleys and pressure to rolls which have a 3-in. diam and are 6 in. long, is applied through gears by a hand lever. The mills are recommended for rolling nonferrous metals in narrow strips."

## Crucible To Acquire Trent Tube Mfg. Co.

*New York*

• • • **Crucible Steel Co.** of America has announced the acquisition of Trent Tube Mfg. Co. at East Troy, Wis., as a wholly-owned subsidiary.

According to W. P. Snyder, Jr., chairman of the board of Crucible Steel, the Trent Co. will retain its corporate identity. It will continue under the present management, headed by Walter H. Wiewel of East Troy, president and head of operations.

Mr. Snyder stated that the stockholders of the Trent Co. unanimously accepted the consideration of 45,000 shares of Crucible Steel common stock in exchange for all of the outstanding stock of Trent.

By the acquisition of these facilities, Crucible has now entered the field of tubular products for the first time in its history. For many years Crucible has been a supplier of tube billets for subsequent fabrication into seamless tubing and never sold finished tubular products in any form.

# Modern Tata Steel Works Make Dream of Indian Industrialist Real

## Expansion Currently Planned Seen Making India Self Sufficient on Steel

o o o

By STEVE SMOKE
*Associate Editor*

o o o

*New York*

• • • **The Tata Iron & Steel Co.** at Jamshedpur is big, the biggest in the world in its way. Only individual plants in the United States and Russia exceed its steel output. But Tata probably exceeds all in its worth to the country's welfare.

It is more than a steel producer. It is a city administrator that provides all the municipal services for a population of 150,000 that also include fully equipped hospitals.

Some 8600 quarters have been built for its employees. To date over $12 million has been spent in developing the community and an additional $1.9 million is spent annually in its administration.

Their wage plan, too, is unique. In Jamshedpur the worker gets a basic wage. On top of this he gets an attendance bonus and to that yet is added a production bonus. But that is not all that he gets. If Tata makes money, then he gets an additional bonus based on a percentage of the company's profits.

In 1947 the sum total of all these bonuses added an equivalent of 3½ months extra pay to the average worker's earnings. Tata's steel workers have been made partners in the company. The plan is truly a progressive one in a country that has come a long way in 40 years.

**Estimates of India's** annual steel needs have been placed at about 2 millon tons of finished steel products. Last year Tata's 70,000 workers turned out the following production:

| Product | Tons |
|---|---|
| Pig Iron | 1,075,000 |
| Steel Ingots | 1,029,000 |
| Finished Steel | 753,000 |

Despite postwar reconversion these production figures compare favorably with the wartime high in production:

| Product | Tons |
|---|---|
| Pig Iron | 1,237,000 |
| Steel Ingots | 1,084,000 |
| Finished Steel | 839,000 |

Tata owns its own coal, and iron ore mines and its limestone quarries. All are located within 80 miles of the plant and exist in great abundance. The iron ore runs about 65 pct iron and the coal is of good coking quality.

About 1 million tons of coke are produced annually in the 204 coke ovens that feed five 1200 ton blast furnaces. Other melting facilities include eight basic openhearths, three acid openhearths, and a duplexing plant with three openhearths and three bessemer converters.

Finishing mills produce sheet, plate, billets, bars, rails and rail accessories, structurals and agricultural tools and implements.

Smaller companies located around the steel works and associated with it, manufacture among other things tinplate, rods, wire nails, bolts, nuts, cables steel mill rods and cables and castings.

When it comes to standing on her own feet as a steel producer, India has yet a long way to go. Tata's 750,000 tons of finished steel added to about 250,000 tons annually made at the Bengal Steel Co., about 50 miles further inland from Jamshedpur, gives India an annual capacity of about 1 million tons. This leaves them about half self-sufficient.

**Exports from Britain** are practically nil, in fact during the war India contributed greatly to the steel needs of the Empire. From the United States she gets only about 10,000 tons annually because of export regulations.

This leaves them but one alternative—to expand and produce all of their own steel products. As a result Tata, the Indian firm, has been seeking funds for expansion as has the Bengal works, a British owned firm.

Tata is asking for a $60 million loan with which to build a new openhearth, a skelp and tube mill. They feel that this amount would provide facilities to increase their capacity 600,000 tons a year.

Bengal is seeking a loan of $50 million for expansion and modernization which they feel will increase their capacity some 300,000 tons a year.

These expanded capacities added to the 1 million tons being produced annually at the present time would increase their finished steel productivity to very near the 2 million-ton mark that would provide the steel necessary for India's self-sufficiency.

At present India is having some difficulty in obtaining the capital for the proposed expansion and modernization programs. But if the past is any indication of what the future will bring forth, it is more than likely that the programs will be carried out because if Tata cannot borrow the money the Indians may rally their rupees and come forth with the capital

### Background

**• • • After a trip to England in the middle of the 19th century, Jamshedji Tata decided that agricultural India should become highly industrialized, and that she should produce goods second to none.**

**He began his industrial revolution by building a cotton mill at Nagpur in 1877 and installed in it what we today call air conditioning.**

**His next vision was that of a steel mill, for no country without iron and steel can really be industrialized. He died in 1904 before his dreams materialized but his sons carried on.**

**After a fruitless trip to England to raise funds, they decided to ask the Indians for the capital. When the request was made, old and young, rich and poor came offering their savings until 3 weeks later, $6.6 million, the entire capital needed for construction requirements was secured. Every penny came from some 8000 Indians.**

**The plant was constructed in 1907 at Sakchi, later named Jamshedpur, with machinery and equipment, bought in America.**

**After the first world war some $27 million, all Indian money, was invested in remodernizing the entire plant so that today the Tata Iron & Steel Co. is one of the largest and most completely integrated plants in the world.**

## Canadian Steel Production and Shipments

*Toronto*

• • • Canadian production of primary iron and steel shapes for the month of June totaled 301,478 net tons, as compared with 318,416 tons in May and with 253,869 tons in June 1947. Output for May included 287,752 tons of carbon steel shapes and 13,726 tons of alloy steel shapes. In the production figures for June are included 88,372 tons of shapes shipped to producers own plants or plants within the primary industry for further processing.

Shipments for sale of primary iron and steel shapes in June amounted to 220,351 net tons of which 206,873 tons were carbon steel shapes and 13,478 tons alloy steel shapes; in May shipments totaled 229,672 tons and included 215,873 tons of carbon and 13,944 tons of alloy steel shapes, and for June 1947, shipments amounted to 188,655 tons including 179,709 tons of carbon and 8946 tons of alloy steel shapes. The above figures which show iron and steel shapes for sale, do not include deliveries for further processing.

The following table shows production and shipments for sale of primary iron and steel shapes for the month of June in net tons:

| June, 1948 | Carbon Steel | | Alloy Steel | |
|---|---|---|---|---|
| | Made | Shipped | Made | Shipped |
| Billets, etc., for forging | 7,478 | 5,133 | 3,293 | 3,231 |
| Other semifinished shapes, not for rerolling by makers | 35,362 | 67 | 583 | ..... |
| Structural shapes and piling | 17,434 | 14,576 | ..... | ..... |
| Plates | 17,061 | 17,542 | 337 | 285 |
| Rails | 32,010 | 34,168 | ..... | ..... |
| Tie plates and track material: | | | | |
| Splice bars | 3,004 | 1,845 | ..... | ..... |
| Tie plates | 2,149 | 2,163 | ..... | ..... |
| Spikes | 1,020 | 1,011 | ..... | ..... |
| Concrete reinforcing bars | 6,645 | 6,707 | ..... | ..... |
| Hot-rolled bars for cold finishing | 582 | ..... | ..... | ..... |
| Other hot-rolled bars | 41,621 | 42,281 | 7,224 | 7,801 |
| Pipes and tubes | 12,036 | 10,718 | ..... | ..... |
| Wire rods | 23,350 | 12,614 | 27 | 68 |
| Hot-rolled black sheets | 26,487 | 16,846 | ..... | ..... |
| Cold reduced black sheets | 4,508 | 3,930 | ..... | ..... |
| Galvanized sheets | 8,690 | 8,111 | ..... | ..... |
| Steel castings | 8,054 | 7,597 | 1,562 | 1,504 |
| Miscellaneous hot rolled products | 21,852 | 4,315 | 491 | 385 |
| All other products | 18,409 | 17,249 | 209 | 204 |
| TOTAL | 287,752 | 206,873 | 13,726 | 13,478 |

Producers' shipments of primary iron and steel shapes subdivided according to principal consuming industries for the month of June, in net tons, follow:

| Industry | Carbon Steel | Alloy Steel |
|---|---|---|
| Automotive industries | 6,794 | 5,480 |
| Agricultural, including farm machinery | 10,993 | 290 |
| Building construction | 25,538 | 160 |
| Containers industry | 16,764 | 260 |
| Machinery and tools | 12,380 | 318 |
| Merchant trade products | 20,060 | 117 |
| Mining, lumbering, etc. | 6,041 | 647 |
| National defense | 1 | ..... |
| Pressing, forming and stamping | 10,759 | 84 |
| Public works and utilities | 1,414 | 28 |
| Railway operating | 31,389 | 302 |
| Railway cars and locomotives | 18,482 | 349 |
| Shipbuilding | 3,202 | 82 |
| Miscellaneous and unclassified | 688 | 148 |
| Wholesalers and warehouses | 24,896 | 588 |
| Direct export (a) to British Empire | 15,018 | 1,178 |
| (b) to other countries | 2,454 | 3,469 |
| TOTAL SHIPPED FOR SALE | 206,873 | 13,478 |
| Producers' Interchange | 87,789 | 583 |

as they have several times before.

Jamshedji Tata and his sons have built more than just an industrial empire. They have built and molded a spirit that typifies Jamshedji's phrase of almost a century ago, "Let the Indian learn to do things for himself."

## Court Rules Pensions Are Bargaining Subject

*Chicago*

• • • The U. S. Circuit Court of Appeals last week added a legal milestone to labor-management relations. In a two-point decision the court upheld previous NLRB rulings to the effect that (1) retirement and pension plans must be submitted to collective bargaining by employers at the demand of unions and (2) union officers must comply with non-Communist affidavit requirements of the Taft-Hartley Act in order to qualify their unions for benefits of the act.

The ruling on the first point was unanimous. The ruling on the second point resulted from a 2 to 1 decision. Judges Otto Kerner, Sherman Minton and J. Earl Major heard the case. Judge Major dissented on the second point.

This decision is the first to declare specifically that the subjects of retirement age and pensions are subjects for collective bargaining. The non-Communist affidavit clause of the Taft-Hartley Act had previously reached the Supreme Court in connection with another case, but the court at that time declined to rule on the clause on the ground that was not an integral part of the point in question.

The case grew out of the retirement by Inland Steel Co. of 224 employees of 65 years of age and older in 1946 under terms of a retirement and pension plan adopted in 1936.

The company contended that neither the question of retirement age nor pension privileges was in the field of collective bargaining and they refused to discuss either with the union. The union then appealed to the NLRB, who ordered the company to bargain on these issues—at the same time stating that the union's officers must file non-Communist affidavits within 30 days.

# Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

**4150 Tons,** Venice, La., Union Electric Power Co. through Stone & Webster Engineering Corp. to Mississippi Valley Structural Co., St. Louis, and Stupp Bros. Bridge & Iron Co., St. Louis.

**1500 Tons,** Bremo, Va., power plant for Virginia Electric & Power Co. through Stone & Webster Engineering Corp. to Bethlehem Fabricators, Inc., Bethlehem.

**875 Tons,** Baton Rouge, La., steam station for Gulf States Utilities through Stone & Webster Engineering Corp. to Bristol Steel and Iron Works, Inc., Bristol, Va.

**560 Tons,** Lake Charles, La., Riverside power station for Gulf States Utilities through Stone and Webster Engineering Corp. to Bristol Steel & Iron Works, Inc., Bristol, Va.

**325 Tons,** Madawaska, Me., boiler house for Fraser Paper Co. through Stone & Webster Engineering Corp. to Harrman Steel Co., Holyoke, Mass.

**285 Tons,** Ishpeming, Mich., power house for Cliffs Power & Light Co. to American Bridge Co., Pittsburgh.

**220 Tons,** Gage Co., Neb., state highway bridge section S4342-3 to Omaha Structural Steel Co., Omaha, Neb.

**200 Tons,** Teletown, Pa., bridge for Warner Co., to American Bridge Co., Pittsburgh.

**140 Tons,** (galvanized structural steel) Baton Rouge, La., substation for Gulf States Utilities through Stone & Webster Engineering Corp. to Lehigh Structural Steel Co., Allentown, Pa.

**110 Tons,** Twin Falls, Idaho, railroad bridge for Union Pacific Railroad to American Bridge Co., Pittsburgh.

• • • **Fabricated steel inquiries** this week included the following:

**1000 Tons,** Odair, Wash., U. S. Bureau of Reclamation Specification 2408. Bids close Sept. 30.

**555 Tons,** Chippewa Co., Wis., bridge section B-1-17-8-2-C2. Bids close Oct. 5.

**350 Tons,** York Co., Pa., Pennsylvania Turnpike Comm., Section 22-C, Central Pennsylvania Quarry, Stripping & Construction Co., Hazleton, Pa., low bidder.

**300 Tons,** Steubenville, Ohio, store for Sears, Roebuck & Co., Oct. 18.

• • • **Reinforcing bar awards** this week included the following:

**1000 Tons,** Philadelphia, Southwest main gravity interceptor sewer, through Accione Contracting Co., to Bethlehem Steel Co., Bethlehem.

**400 Tons,** Philadelphia, warehouse addition for Strawbridge & Clothier Co., to Bethlehem Steel Co., Bethlehem.

**315 Tons,** Philadelphia, Market St. subway extension, to Golder Construction Co.

**180 Tons,** Lancaster, Pa., Armstrong Cork Co., through Wickersham Co., Lancaster-Pa., to Bethlehem Steel Co., Bethlehem.

**140 Tons,** Alma, Wis., power house for Dairyland Power Cooperative. Through La Cross Dredging Corp. to Bethlehem Steel Co., Inc., Bethlehem.

• • • **Reinforcing bar inquiries** this week included the following:

**400 Tons,** Boston, substructure for Boston approach to Mystic River Bridge. Completion date June 30, 1949. Bids to Sept. 30.

**200 Tons,** Kankakee, Ill., acute hospital for State of Illinois. John Morroff and son, low bidder.

**185 Tons,** York Co., Pa., Pennsylvania Turnpike Comm. Section 22-C, Central Pennsylvania Quarry, Stripping & Construction Co., Hazleton, Pa., low bidder.

**185 Tons,** Peoria, Ill., power house for Illinois State Hospital. S. N. Nielsen, low bidder.

**125 Tons,** Anna, Ill., residential building, Anna State Hospital, Federal Construction Co., low bidder.

• • • **Railroad car awards and inquiries** this week included the following:

New York Central R. R. Co. has ordered from the St. Louis Car Co., St. Louis, 100 electric multiple unit coaches, with delivery to start Sept. 1949.

## Second Blast Furnace At Fontana Scheduled by Kaiser Co., Inc.

*Los Angeles*

• • • **Production of iron** will be doubled on the West Coast—from 438,000 to 876,000 tons per year. This will be done within 8 or 9 months if Kaiser Co., Inc. duplicates its wartime construction speed. The new construction will be in the form of the company's second 1200-ton capacity blast furnace and related facilities at Fontana, 50 miles east of here. The $17 million project, announced this week, will be privately financed.

Long a hope of Henry J. Kaiser, this second stack is being made possible through financial arrangements growing out of a contract under which Kaiser Co., Inc. supplies approximately one half million tons of steel plate to the Transcontinental Gas Pipe Line Co. at a cost of approximately $60 million. The plates will be fabricated into 1840 miles of 26-in. and 30-in. pipe to carry natural gas from Texas to New York City.

Manufacturer of the pipe has not been named, but since it has been stated that fabrication will take place in this area, it is believed that Consolidated Western Steel Corp. would be the logical producer because of its facilities and experience in this field. This company was recently purchased by Columbia Steel Co., U. S. Steel Corp. subsidiary. The pipe line project will involve a total expenditure of approximately $189 million according to Claude A. Williams, president of Transcontinental.

**Kaiser Co., Inc.** is starting on plate production for this order immediately and final deliveries are expected to be made some time in 1950. Annual capacity of the Fontana 110-in. plate mill is now approximately 300,000 to 350,000 tons per year.

## Pig Iron Shortage, High Price of Scrap Pinching Foundries

*Philadelphia*

• • • **The pinch of** high scrap prices and the pig iron shortage have begun to cut down the operations of eastern foundries. Two foundries in Baltimore have already gone out of business, and it is understood that another in New Jersey is on the verge of closing. The Sexton Foundry & Mfg. Co. and the Keystone Foundry Div. of Keystone Electric Co. closed down their operations in the last few weeks.

Competition among jobbing foundries in the east became keener during the summer when order backlogs for castings dropped off sharply. Buyers, reacting to the higher current castings prices and the easier market, have been rejecting castings with minor imperfections that would have passed inspection easily 6 months ago.

In the present shortage of pig iron, foundries are having a great deal of difficulty in improving the quality of their castings. Their scrap charges are constantly increasing, even at present high prices for cast scrap.

**The continued** operation of a great many small foundries can be jeopardized at this time by the rejection of a single large order for castings. Big iron sellers and scrap brokers have found that many foundries are getting into financial difficulty because of their high metal costs and the high rate of rejections. They say that payments for shipments are slower now even from foundries who always paid promptly in the past.

The financial problem of the foundries is indicated by a study of current costs of materials. These days, a single 50-ton car of cast scrap will cost a foundry $3500. A 100-ton order for pig iron from merchant producers in the east will cost $5100 delivered.

## Defers Basing Point Suit Until Oct. 22, Hearings to Continue

*Washington*

• • • **The American Iron** & Steel Institute and 101 steel firms have been given until Oct. 22 to file motions for striking out or limiting material which the Federal Trade Commission has offered as evidence supporting its charges of conspiracy to fix identical or matched prices.

Commission attorneys will have an additional two weeks, until Nov. 4, to answer the motions. Some time after that date, Trial Examiner Frank Hier will rule on the motions. The FTC rested its case on Sept. 22.

No motion by defense attorneys to dismiss the whole case is expected before at least mid-November. Examiner Hier will not rule on the evidence until he has had time to wade through the thousands of pages of material submitted and the record will not be closed to correction until Nov. 15.

Also, defense counsel appear to feel that these rulings, when made, may substantially weaken the government's case, if not against the entire group, at least against some of the defendants.

In resting his case, FTC attorney Lynn C. Paulson said the material he had offered as evidence conclusively showed that a "planned common course of action" had succeeded in "making delivered prices identical" not only on open quotations but on sealed bids.

Two seriously adverse effects had resulted, he charged. By "refusing to sell f.o.b. mill," he said, transportation of steel had been "limited to railroads," thus discriminating against truck and water carriers.

Also, he declared, the effect of this understanding arrived at "through the offices of the institute" had contributed greatly to industrial concentration — also a thorn in the side of FTC.

Examiner Hier made clear that in ruling on the case he is not concerned with the basing point system as such, or the effect of the use of the same freight data and extra charges and deductions—only whether conspiracy is involved.

He warned steel counsel that he would deny motions to strike material when it appeared that the material was "reasonably" pertinent to the support of conspiracy charges. On the other hand, he told FTC attorneys that he would accept only that material which definitely tends to show a pattern pointing toward conspiracy.

The hearings have been adjourned, on the usual five-day notice basis, presumably until after rulings have been made.

## New Fabricating Shop Starts in Pittsburgh

*Pittsburgh*

• • • **The first fabricating shop** to open here since the changeover to f.o.b. mill steel sales is the Converto Co., which recently began operations in the Lawrenceville district. Its head, Harry R. Savage, started it by hiring engineers and construction men who first erected the shop, then went to work in it.

The $650,000 shop contains half a dozen heavy and light shears, plus brakes, presses and allied equipment. One section, headed by works manager Walter R. Dickson, fabricates structural materials for the building trade and for industry. Another does stainless steel fabrication. Joseph W. Larimer, formerly manager of Jessop Steel Co.'s stainless division, is manager of alloy sales for Converto.

The office building is probably the most modern, if not the most ingenious in Pittsburgh. An artesian well supplies cold water for summer air conditioning after which it is pumped over the roof to form a 4-in. thick insulator. Not a new idea but one not widely used in the East. The building has a kitchen where office workers can whip up a light lunch.

## Introduces New Motors

*Milwaukee*

• • • **A new line of** tube-type, totally enclosed, fan cooled, squirrel cage motors ranging from 150 to 600 hp has been introduced by Allis-Chalmers. The motor is divided into two isolated parts with each side having its own path of internal air circulation.

Through this construction it is possible by simple maintenance to keep the motor free of the power destroying agents which tend to clog air passages in the conventional type of fan cooled motors. The use of tubular type heat transfers is similar to the general methods employed in previous motors of larger size built by this company.

### Coming Events

**Oct. 4-7** **American Institute of Steel Construction,** annual convention, Quebec, Canada.
**Oct. 5-7** **Industrial Packaging Engineers Assn.,** Industrial Packaging and Materials Handling Exposition, Chicago.
**Oct. 5-9** **Concrete Reinforcing Steel Institute,** semiannual meeting, Asheville, N. C.
**Oct. 6-9** **Society of Automotive Engineers,** national aeronautic meeting, Los Angeles.
**Oct. 11-13** **National Lubricating Grease Institute,** annual convention, Chicago.
**Oct. 11-13** **American Society Tool Engineers,** semiannual meeting, Los Angeles.
**Oct. 13-15** **Porcelain Enamel Institute,** annual forum, Urbana, Ill.
**Oct. 14-15** **Gray Iron Founders' Society,** annual meeting, Atlantic City,
**Oct. 18-20** **National Metal Trades Assn.,** annual convention, New York.
**Oct. 18-22** **National Safety Congress and Exposition,** Chicago.
**Oct. 22-25** **Metal Treating Institute,** annual meeting, Philadelphia.
**Oct. 23-29** **American Society for Metals,** annual convention, Philadelphia.
**Oct. 24-29** **American Welding Society,** annual meeting, Philadelphia.
**Oct. 25-27** **American Institute of Mining and Metallurgical Engineers,** Metals Div., fall meeting, Philadelphia.
**Oct. 25-27** **American Gear Manufacturers Assn.,** fall meeting, Chicago.
**Oct. 25-29** **National Metal Exposition,** Philadelphia.
**Oct. 27-28** **Society for Nondestructive Testing,** annual convention, Philadelphia.
**Nov. 4-6** **National Electronics Conference,** Chicago.
**Nov. 14-17** **National Tool & Die Manufacturers Assn.,** annual meeting, Milwaukee.

# Weekly Gallup Polls . . .

## Americans Fear War More Than British Do, Poll Shows

***Princeton, N. J.***

• • • **Are we going to have another war?**

That question in the minds of the man in the street in a dozen or more capitals of the world takes on increasing significance in view of the Berlin crisis and of Secretary George Marshall's statement that American-Russian relations are "deteriorating," according to George Gallup, director, American Institute of Public Opinion.

There is substantial fear of war among the people of many countries, an international poll shows. Polling organizations in nine nations, affiliates of the World Gallup Polls, put the question of war within ten years to voters in each country and found that there is greatest fear in Italy, the United States and Canada.

However, in the United States less than one-third think we will be involved in war within the next year.

"Do you think there will be another big war within the next ten years?"

Here are the views of the people in the nine countries:

| | Will Be War Pct | Will Not Pct | No Opin. Pct |
|---|---|---|---|
| Italy | 58 | 26 | 16 |
| UNITED STATES | 57 | 26 | 17 |
| Canada | 56 | 25 | 19 |
| Norway | 53 | 27 | 20 |
| Holland | 52 | 34 | 14 |
| Denmark | 46 | 22 | 32 |
| Sweden | 36 | 53 | 11 |
| England | 35 | 36 | 29 |
| Finland | 28 | 42 | 30 |

The way the people in various countries view the international situation so far as war is concerned will determine how they will vote on issues of national defense, on foreign policy and may determine what kind of leaders they will elect to represent them.

In the United States the poll put to voters in a separate but comparable cross-section, a question concerning war in the immediate future, as follows:

"Do you think the United States will find itself in another war within, say, the next year?"

The vote:

UNITED STATES

| | Pct |
|---|---|
| Yes | 32 |
| No | 54 |
| No opinion | 14 |

Those who voted yes were asked: "Who do you think will be responsible for starting the war?" The vote:

| | Pct |
|---|---|
| Russia | 24 |
| U. S. A. | 3 |
| Other | 4 |
| Don't know | 3 |
| | 34* |

(*Adds to more than 32 pct because some respondents gave more than one answer).

• • • **Analysis of public** opinion regarding the 1948 draft law leads to two important conclusions:

(1) Voters approve the law by an overwhelming majority, but very few have a correct understanding about the length of service it requires from inductees.

(2) The fact that seven out of ten voters approve the law explains why it has not become an issue between the two major parties in this presidential campaign and is debated at all only by Henry Wallace and his Progressive Party.

A few days prior to the beginning of registration under the act the institute asked this question of representative voters across the country:

"On August 30, all men between 18 and 25 years of age will start registering under the Federal draft law. In general, do you approve or disapprove of the draft?"

The answers nationally were:

| | Pct |
|---|---|
| Approve draft law | 73 |
| Disapprove draft law | 21 |
| No opinion | 6 |

Rank and file Democrats and Republicans see eye to eye on the draft. Wallace followers are split on the question, and, although a majority of them voiced disapproval of the draft, a substantial minority approve it. These political sidelights can be seen when the views of Dewey, Truman and Wallace voters are compared:

## Voters Approve Draft Law But Misunderstand or Are Unaware Of Length of Service Required

o o o

BY POLITICAL PREFERENCE

| | Dewey Voters Pct | Truman Voters Pct | Wallace Voters Pct |
|---|---|---|---|
| Approve draft law... | 75 | 77 | 32 |
| Disapprove draft law. | 20 | 18 | 59 |
| No opinion | 5 | 5 | 9 |

When voters are asked how long they think a youth should serve, 55 pct say 18 months or less, and only one in five thinks 21 months or 2 years would be right.

Actually, very few people realize what the law requires in regard to the length of service in the armed forces. To ascertain this lack of information, interviewers asked this question:

**"Will you tell me how many months service a young man has to put in under the new draft law?"**

The odd fact is that very few voters in the nation know exactly what the law says on this point. Four out of ten voters say 18 months or less is required, and 17 pct say two years. Only one in five said 21 months, which is part, but only part, of the correct answer.

Here is what the law says:

Every draftee must serve a basic 21 months. On top of that he must serve an additional 12 months unless he agrees to do one of two things; either join the National Guard for an additional three years after his 21 months of service, or enlist for an additional five years in the organized reserve.

Evidence from this survey indicates the possibility of a morale problem unless the public, and particularly the inductees and their families, are educated to an understanding of the terms of service in the armed forces laid down by the new law.

## New Housing Starts Show Sharp Decline In 2-Month Period

*Washington*

• • • **Despite continuing** record production of building materials, aided by voluntary allocations of steel, new housing starts have dipped sharply downward during the first 2 months of 1948's second half. Overall building, however, continues upward.

Labor Dept. preliminary estimates for August place the number of new dwelling units started at 83,000, a decline of 11,000 units from the July estimate and 13,000 below June.

It is the first time this year that new housing starts have fallen below figures for comparable months last year. The decline has been particularly noticeable in California and Texas where permit applications have slumped as much as 25 pct.

Since considerable increase has been shown in some parts of the South and North, however, there has been no further revision in the government's raised estimate of 950,000 home completions this year. For the first 8 months of 1948, dwelling units started exceeded the 1947 figures by 123,000.

**With dollar value** of all construction for the first half of the year standing at about $8 billion, as yet government officials see no reason for doubting a new building record of $18 billion will be reached.

Building materials production for the first 6 months, on an overall basis, is some 6 pct higher than for last year. Increased production (over 1947) is noted particularly as to fabricated structural steel, reinforcing bars, rigid steel conduit, and heating items including radiation.

Despite voluntary allocation agreements which cover a few such items, steel continues to be the big question mark.

## Freight Cars on Order Increases 3.6 Pct Over Sept. 1 of a Year Ago

*Washington*

• • • **All railroads** and private carlines had 117,815 new freight cars on order as of Sept. 1, 1948, the Association of American Railroads has announced. The number on order on Sept. 1, 1947, was 113,680.

Of the total number, Class I railroads and railroad-owned and controlled private refrigerator car companies on Sept. 1, 1948, had 105,959 new freight cars on order. On Sept. 1, 1947, there were 105,261 on order.

New freight cars on order by Class I railroads and railroad-owned and controlled private refrigerator companies on September 1 this year were as follows: 25,205 box including 24,855 plain and ventilated and 350 automobile box cars; 51,464 hopper including 3800 covered hoppers; 17,999 gondolas; 4053 flat; 5807 refrigerator; 591 stock, and 840 miscellaneous freight cars.

Of the total number of new freight cars which Class I railroads on Sept. 1 had on order, 32,291 will be built in railroad shops and 73,668 in outside shops.

Class I railroads also had 1626 locomotives on order on Sept 1 this year, compared with 851 on order on Sept. 1, 1947. The number for which orders had been placed on Sept. 1, 1948, included 116 steam and 1510 diesel locomotives, compared with 40 steam, four electric and 807 diesel one year ago.

Class I railroads and railroad-owned and controlled private refrigerator car companies put 69,083 new freight cars in service in the first 8 months of 1948, compared with 31,390 in the same period in 1947. In the month of August, 1948, the railroads installed 10,191 new freight cars, the largest number for any month since April, 1942. In August last year, 5216 new freight cars were put in service.

Those installed in the 8-month period this year were as follows: 28,484 box cars which included 27,420 plain and ventilated and 1064 automobile; 28,229 hopper including 1455 covered hoppers; 6949 gondolas; 4840 refrigerator; 49 flat; 259 stock and 273 miscellaneous freight cars.

They also put 847 new locomotives in service in the first 8 months of 1948 of which 41 were steam, four electric and 802 diesel. New locomotives installed in the same period last year totaled 535 of which 63 were steam, two electric and 470 diesel.

Class I railroads and railroad-owned and controlled private refrigerator car companies in the first 8 months of 1948 retired 52,771 freight cars of which number 8054 were retired in the month of August. In the same 8-month period of 1947, there were 41,843 retired.

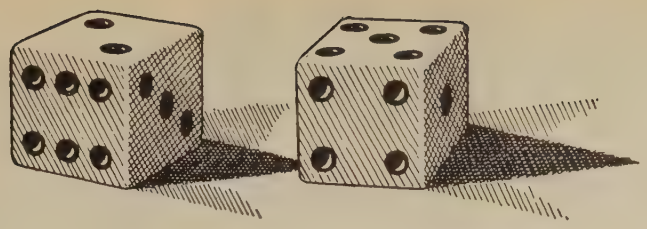
POWER PLANT: *Continental engineers display a 12-cylinder, 810 hp aircooled unit developed especially as a powerplant for military vehicles. Army officials indicate that the same basic engine will be used for army ground vehicles designed for front-line operations.*

## FTC Dismisses Complaint

*Washington*

• • • **The Federal Trade** Commission has dismissed its amended complaint against the E. S. Liquidating Co., formerly Empire Steel Corp., Mansfield, Ohio, since it is no longer producing steel. The complaint charges the American Iron & Steel Institute and 101 producers of steel products, including the Mansfield concern, with conspiracy and collusive action to fix and maintain delivered price quotations and to restrain competition.

The Commission found that the E. S. Liquidating Co. sold all of its assets to the Studebaker Corp. in December 1948, and has not been a member of the American Iron & Steel Institute since April 1948.



# Let's bet on a sure winner ...the American salesman!

America's new national pastime seems to be "razzing the salesman".

Know-it-alls tell us that salesmen have grown permanently fat and lazy. Pessimists say salesmanship is dead. They state that, once present pent-up needs are satisfied, we'll be unable to create sufficient buyer demand to maintain our 200 billion dollar national income. They even claim that our 90 billion dollars of "free" money (over and above our requirements for food, clothing, shelter, savings, etc.) will go begging for want of salesmanship.

*Let's look at the facts!*

Salesmen worked harder during the war than ever before. Their services, in moving their companies' products to war plants, were vital factors in victory.

*Every concern which emerged from the war with its customer list reasonably intact, did so because Mr. Salesman "sold" his company when he had nothing else to sell.*

Since the war, salesmen have withstood history's greatest buyer onslaught. In many cases, they've made "enough critical merchandise for two" satisfy four customers. All in all, they've done it well!

In other cases they've introduced new products . . . sold them, kept new industries alive. They've disregarded rumors, loose talk, false fears.

*Since the days of the Yankee Traders, America's salesmen have met every challenge.* They've sold us from 13 struggling colonies to the mightiest nation. They've licked wars and panics. They've given us the world's highest living standards.

Now, in the face of the greatest selling opportunity of all time—it's illogical, it's silly to doubt their ability to carry on.

*America can confidently entrust its prosperous future to AMERICAN SALESMEN*.* P&P-5043

David J. Bennell

*Vice Pres., Charge of Sales*

Certified CHAIN INSTITUTE Member

*In 1940 American business had 3,188,854 salesmen. Today it employs 2,750,000. On the basis of present national income and the 90 billion dollar "free" market, 9 salesmen must sell 4 times as much today as 10 sold in '40. Obviously—*we need one million more salesmen—NOW!*

Since DR DAVID ROUND CHAIN & HOISTS 1869

**CLEVELAND CHAIN**

**The Cleveland Chain & Mfg. Co.**

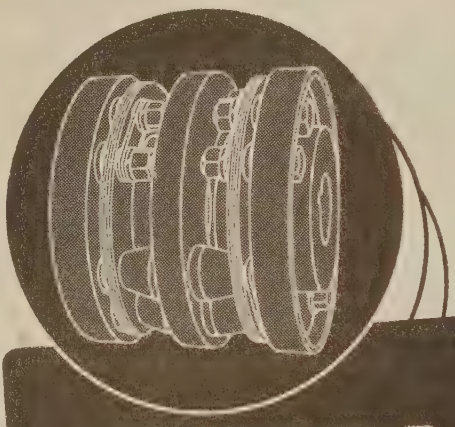
*Cleveland 5, Ohio*

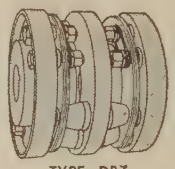
Associate Companies: David Round & Son, Cleveland 5, Ohio • The Bridgeport Chain & Mfg. Co., Bridgeport 1, Conn. • Seattle Chain & Mfg. Co., Seattle 8, Wash. • Round California Chain Co., So. San Francisco and Los Angeles 54, California Woodhouse Chain Works, Trenton 7, N. J.

*Security In Every Link*

# THOMAS
## *Flexible* COUPLINGS

....are specified by engineers, wherever 100% Operating Efficiency is demanded





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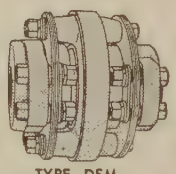

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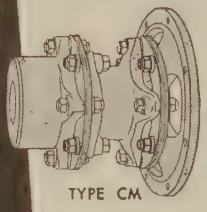

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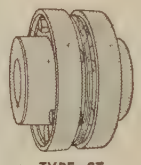

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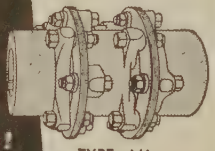

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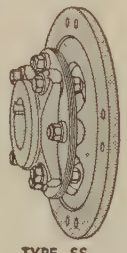
The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.



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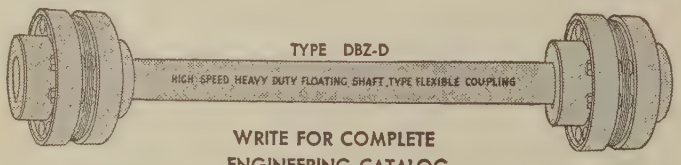


WRITE FOR COMPLETE ENGINEERING CATALOG

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA




## Tool Orders Slowed By European Politicians And ECA's Reluctance

*New York*

• • • **Orders for American** machine tools have been piling up on the desks of European manufacturers for the last year and a half but dollars have not been allocated because of local European politics and ECA's reluctance to use a firm hand in dealing with ERP requirements, according to Alexander G. Bryant, President of the National Tool Builders Assn. who completed a 6-week tour of western European countries to investigate the lag in the expected tool orders under ERP.

European politicians are concerned with immediate relief requirements, rather than those bearing on long-term recovery while ECA so far has steered clear of any action that might be construed as "dictating" by Western European Communists eagerly seeking a hitching post for their "Western imperialism" charge. ECA under Paul Hoffman is on the right track, he pointed out, but the program as far as the tool business is concerned must be pushed with ECA making it clear that machine tools must be included in allocations.

At the present time, Mr. Bryant stated, actual orders for $150 million worth of machine tools are waiting to be filled but the various governments have not asked for allocations under ECA for this business. Although Mr. Bryant made this study in an unofficial capacity as far as the recovery program is concerned, he stated that Holland officials have put in a token allotment of $5 million as a starter and Italy a larger amount for machine tools with allocation requests from other countries in the offing. It was his belief that American manufacturers should begin to feel the effects of increased orders toward the end of this year.

**To give European** manufacturers a freedom of machine tool choice, which in most cases would mean American machines because of higher efficiency, Mr. Bryant suggested a three-point program which would include the following: (1) Europeans must demand from their governments production tools best suited to requirements, (2)

THE Preformed Challenge
Here's a CHALLENGE to the few who have not used Preformed Wire Rope:
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Put Preformed to work on your job.
See for yourself if it isn't
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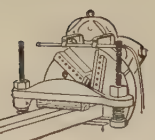
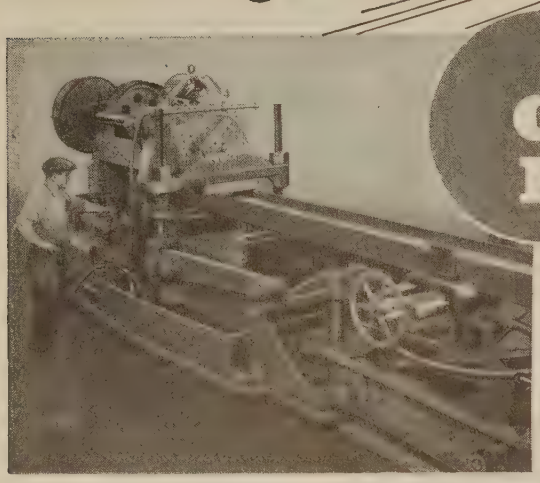
FOR Column End-Facing





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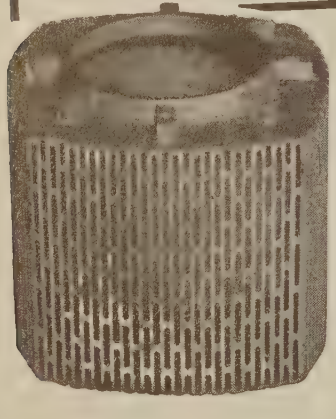
- Anti-friction bearings
- Quick-Acting Pneumatic Clamp
- Hydraulic Feed

Write for Bulletin 316

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, 23, PA.

8

Perforated Strainers and—



HENDRICK is fully equipped to fabricate a wide range of products from perforated plate, that also involve shaping, forming, welding, riveting, brazing, etc. The pump strainer illustrated is a typical example.

For such operations Hendrick has an exceptionally large stock of dies and patterns, complete tool equipment, and ample forming and welding facilities. Write for detailed information.

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ECA should point out to these governments that tools are available on order and should be purchased in place of European makes, when and where available, for operations requiring a high degree of efficiency and (3) that American manufacturers must resort to solid salesmanship on their part to promote orders.

## Dr. L. W. Chubb Retires After 43 Years Service

*Pittsburgh*

• • • **Dr. Lewis W. Chubb,** director emeritus of the Westinghouse Research Laboratories here, has retired after 43 years of scientific research with the company.

Dr. Lewis W. Chubb

Dr. Chubb has been active in the development of jet propulsion, microwave apparatus, new types of torpedoes, fire control systems, and high temperature alloys.

He has received more than 150 patents covering inventions in radio, electronics, jet propulsion, telephony, electrical equipment, radar and many other fields.

Last year Dr. Chubb was awarded the John Fritz Medal, the nations highest tribute to scientists and engineers.

## Question of Need For Legal Pricing System Under Study by Council

*Washington*

• • • **The Senate** Advisory Council on Trade Policies held its first—and probably only—open meeting here and was officially handed its basic assignment: What, if anything, should Congress do about legalizing any pricing system?

Senator Capehart, R., Ind., chairman of a Senate Commerce Subcommittee investigating trade policies, told the council—which he appointed—that its fundamental

# This Tubular Pitcher makes a hit

Powered by compressed air, this new invention will throw a baseball faster and more accurately than any human can. It can be adjusted to pitch 8 different curves, and will groove the plate every time, at the exact height desired. Eagerly adopted by major league ball clubs, this mechanical pitcher even takes on batting chores—when set up over home plate, it will lay down a 400 foot fungo in any direction.

The barrel, curve adapter and air chamber of this "iron man" are seamless steel tubes. The barrel bore is required to fit a baseball without seizing, yet tightly enough to prevent loss of compressed air power while firing. Despite this unusual specification, tubing of the required size is regularly supplied—right out of Frasse warehouse stock.

You're invited to be choosey when you work with Frasse tubing stocks. Sizes in mechanical tubing range from a convenient $\frac{3}{32}$" to $10\frac{1}{2}$" O.D.—and unusually complete inventories are equally handy in stainless tubing, aircraft tubes and condenser and pressure tubes. What are your requirements? *Peter A. FRASSE and Co., Inc., 17 Grand Street, New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia 29, Pa. (Baldwin 9-9900) • 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) • Jersey City • Syracuse • Hartford • Rochester • Baltimore*

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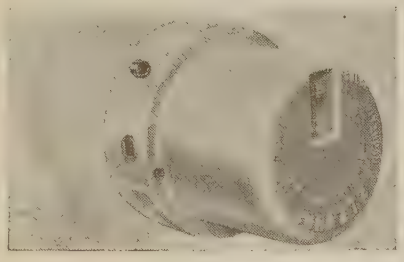

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job was to recommend what pricing systems should be declared legal or illegal by Congress.

## New Borg-Warner Plant To Make Aircraft Parts

*Cleveland*

• • • **Pesco Products Div.** of Borg-Warner Corp. will start construction of a $2,650,000 production plant and research laboratory in Bedford Township immediately, C. S. Davis, president, Borg-Warner Corp., said recently.

Precision aircraft parts including fuel pumps for rocket and jet engines will be manufactured in the new plant. General expansion in several manufacturing fields as well as increasing requirements of the new 70-group air force dictated the need for a new factory.

R. J. Minshall, president, Pesco Div., said the building will also house a complete metallurgical laboratory for testing of all material prior to use, an electrical laboratory, and a research laboratory for testing aviation and industrial hydraulic equipment.

All production in the one-story brick and steel plant, which will contain 219,200 sq ft of floor space, will take place on one floor with a "U" shaped flow path permitting materials to be fed and taken away from machine operators without disturbing their work.

## Purchases Land to Erect A West Coast Pipe Plant

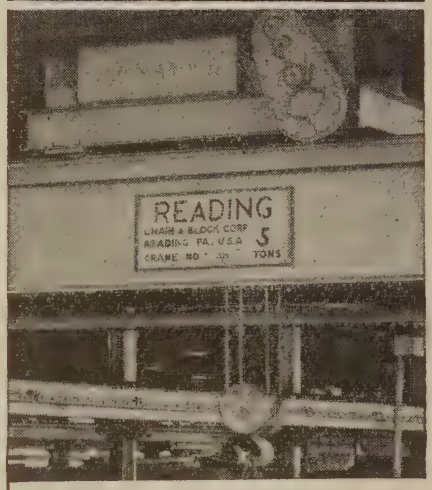
*Burlington, N. J.*

• • • **U. S. Pipe** & Foundry Co. is going West as many other manufacturing plants have done since the multiple basing point method of selling steel products has been declared illegal.

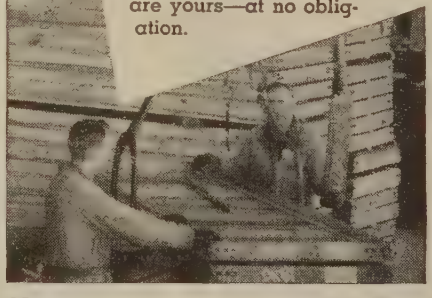
The company has purchased a 35-acre tract of land in Richmond, Calif., for the purpose of erecting a plant to make cast iron pressure pipe. This plant will give them a West Coast outlet for this product.

U. S. Pipe, whose general offices are here in Burlington, also operate cast iron pressure pipe manufacturing plants at Birmingham, Bessemer, Ala., Chattanooga, Tenn., and Addyson, Ohio.


**FAST MATERIALS HANDLING**
For YOUR New Building!




•• New buildings, like new machines, are *designed* to increase output and reduce unit costs. That's why it pays to consult a Reading Engineer *before* you install handling equipment in a new shop or plant. For example, in this new annex, crates of sheet steel moved too leisurely from flat cars, to stock pile, to motor truck . . . until a Reading Engineer was consulted. After careful analysis, 2 *specially-designed* 5-ton Reading Cranes, equipped with electric push buttons were recommended and installed. Now crates "step lively", handling time is reduced . . . *and fewer men move more materials, more easily!* Start your new building "off on the right foot", now. For faster, more economical materials handling, call in a Reading Engineer. His experienced recommendations are yours—at no obligation.



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Chain Hoists • Electric Hoists
Overhead Traveling Cranes

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## Get these new facts on Arc Welding to decision-makers in your plant

**This easy-to-take 'Pack of Facts' makes the information crystal-clear**

Today's arc welding offers the key men in your plant unprecedented opportunities to cut costs . . . improve quality . . . lick difficult production problems. Get them the latest facts on this versatile industrial tool *now!*

IT'S EASY—General Electric, as a service to industry, has prepared the facts for you in visual terms that are easy-to-take . . . linger in the memory.

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**1. A fact-packed manual,** describing practical applications of electric arc processes . . . production feats. *Without sales bias,* it surveys the field *authoritatively.*

**2. A full-color, sound motion picture,** running thirty minutes, which shows arc welding increasing production and cutting costs in plants like yours.

**3. Fully-illustrated highlights booklets,** for individual study and review.

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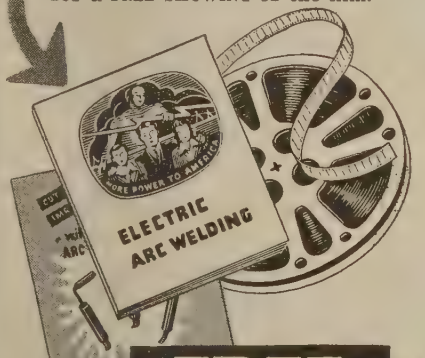
**Showings Cost You Nothing**—With your manual, we'll tell you how to arrange for a FREE SHOWING of the film.

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Please mail me a sample copy of the G-E *Arc Welding Manual* without cost or obligation, with details on how I can arrange for a FREE SHOWING of the film. (Extra copies at regular manual price—$1.25.)

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GENERAL ELECTRIC


## European Letter

(CONTINUED FROM PAGE 88)

retical case can be made on paper, though neither the Minister nor the Transport Commission have given any public sign of understanding what it is. There may be other industries, including some that have never appeared on the Labor Party's lists, where similar real economies would result from public ownership and would offset the wastes of bureaucratic, politically-minded organization. But the essential point is that the case must be proved, industry by industry, with the onus of proof on the nationalizers, before it will be accepted by the public at large.

WITHIN a few weeks the debate will open on the Steel Bill. It will be for the Government to prove their case. It will not be an acceptable argument to say that the steel industry is basic, or important. If that were all, it had better be preserved from the grip of the octopus. Still less will it carry conviction to say that, in its present organization, the steel industry represents a "dangerous concentration" of "irresponsible power." The public should ask "power to do what?" and "what reason is there to believe that the Minister of Supply will exercise it any better?" It will be of no use to argue that the private steel industry is, or has been, imperfect in its organization and policies; the question is whether the state would do any better. It will not carry very much conviction to say that the steel industry is a monopoly; the proper answer is to ask whether and how it can be made less of a monopoly, and what measures, the relaxation of protection against imports or other devices, can help to secure that it does not abuse its monopoly. None of these things would be a whit less necessary if the industry were publicly owned; Mr. George Strauss cannot hold a candle to the power of competition as a guardian of the public interest. The ultimate test is very simple, if the steel industry were nationalized, would it produce better steel more cheaply?

On these issues the central body of opinion still has an open mind. Most people are waiting to see what sort of case the Government will make.


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**DOES CUT FINISHING COSTS**

**FISHING REEL MFR. REPORTS . . . (NAME ON FILE)**

"The cost of finishing 11,000 crank plates by hand involves 268 hours at $1.18 per hour for a total of $316.00.

"The cost of finishing the same by Roto-Finish involves 138 hours at 30c per hour or a total of $41.00. The net saving is $275.00."

Unretouched illustration shows crank plate for fishing reel; above, before Roto-Finish deburring and finishing; below, after Roto-Finishing.

Such savings are possible in your finishing department, too! See how Roto-Finish produces a semi-lustrous surface uniformly on one or a thousand pieces; how it handles precision work. Send sample die castings, stampings, machined parts, forgings for processing. Include finished part for guide. No obligation! THE STURGIS PRODUCTS CO., 834 Jacob Street, Sturgis, Michigan.

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# MACHINE TOOLS

. . . News and Market Activities

## Current Business Volume Low; Optimism Exists for Future

• • • **In Detroit,** one of the key markets of the machine tool industry and Mecca of many a vice-president in charge of sales, there are a few bright spots on the horizon this week but for most machine tool builders and dealers present volume is substantially below that reported earlier this year.

Most significant job in Detroit at the moment is the new automatic transmission for Chevrolet at Saginaw which is destined to be a sizable program, according to machine tool sources. Present reports indicate that orders for most of the major equipment will be placed within the next 60 days. There are some indications that a few orders have actually been placed. Most sources believe the new transmission for Chevrolet is at least 6 months away on the basis of present ordering.

Expectations are that new equipment for the Packard automatic transmission will be placed within a fortnight. There has been considerable unexplained delay in placing this program which is reported to have a green light from Packard top management for production at the earliest possible date.

**Inquiries have been** reported for some product improvement at Chrysler-Jefferson. The Detroit small shop market for new equipment, long a buoyant factor, is spotty although some sources indicate a considerable volume is still coming from this segment of the market.

Reports that Ford is about ready to prepare for production at Detroit Gear of its new automatic transmission are not confirmed.

Another Detroit development that is receiving considerable attention is the reported request by the local ordnance district for quotations on machines in quantities ranging up to 50 units. There are no indications however that the new equipment, if purchased, will be used in production in the near future.

### New Automatic Transmission Destined for Sizable Tooling Program

° ° °

Settlement of the Briggs strike here has acted as a spur in the tool and die shops, many of which were reported shut down or operating on reduced schedules because of a pattern tie-up at Briggs. It is now expected that Detroit foundries will move quickly to produce the dies that must be made if the GM and Chrysler new model programs are to come through even close to schedule.

**In Philadelphia,** trade sources report that no rearmament program orders have been placed there. At the same time, aircraft manufacturers who had projected heavy tool buying programs have had to defer them pending a search for the required tools in government-held or JANMAT stocks. In one case where a $6 million program was in prospect, lack of a firm aircraft production order at this time required trimming the program to about $150,000 for financing by the aircraft manufacturer.

In Athol, Mass., G. F. Holland, president of Union Twist Drill Co. blames lower sales this year on over-expansion during the war.

Mr. Holland points out that sales may be running comparatively high, because of the great capacity for production of standard items available in the country today. Only 30 pct of Union's present volume comes from standard items, with the remainder supplied by special orders. Before the war, 75 pct of the company's volume was in standard items.

**Prices on the** company's products have not been advanced for the past year and are 20 pct above 1939, as compared with an advance in labor costs of about 300 pct. Union has also been hit by the high cost of tungsten, caused by government stockpiling. One grade of alloy steel has advanced about 30 pct in price since prewar days due to the increase in the price of tungsten.

According to Mr. Holland, the company expects some increase in volume within a couple of years from ECA and the jet program. He feels that not much retooling can be expected from the automobile industry in the near future.

**In Cleveland,** preliminary figures released by National Machine Tool Builders Assn. indicate that August business, contrary to expectations, was somewhat below July levels. New firm orders including foreign were off slightly from July at 73.6 as compared with 74 for the previous month. August shipments were up at 69.2 as compared with 62.4 for July. Foreign orders alone decreased from 13.3 in July to 12.7 in August. The figures are issued in index form. Base is average shipment for 1944-45-46 equal to 100.

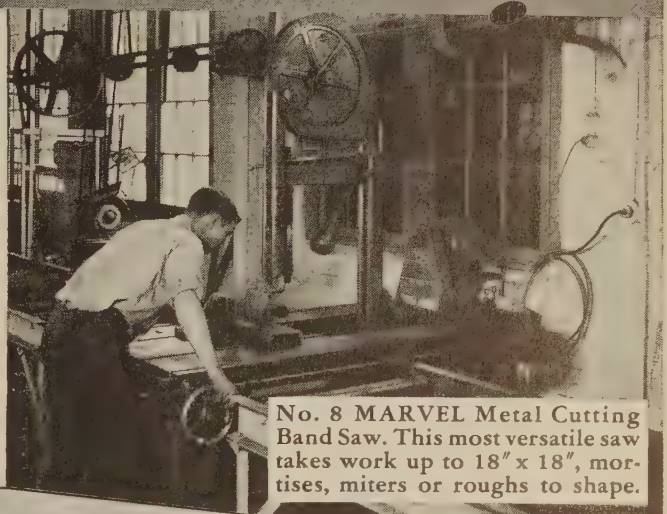
While trade circles differ widely in appraising the present trend in the machine tool market, there is a growing belief that the postwar pattern of the machine tool business has pretty well emerged. Since July, 1946, there has been a gradual and sometimes sporadic downtrend in new firm orders, on the basis of dollar volume, despite price increases. Foreign orders have been tapering off steadily. Shipments have held up rather well, with a corresponding reduction in backlog.

Disturbing as this trend may appear, in view of the industry's greatly increased capacity as the result of the war, some sales executives do not take the grim view, pointing out that the problem now is to forget the war period. On the other hand, first of the pool or "phantom" orders were placed last week, and perhaps the industry will go through the cycle all over again.

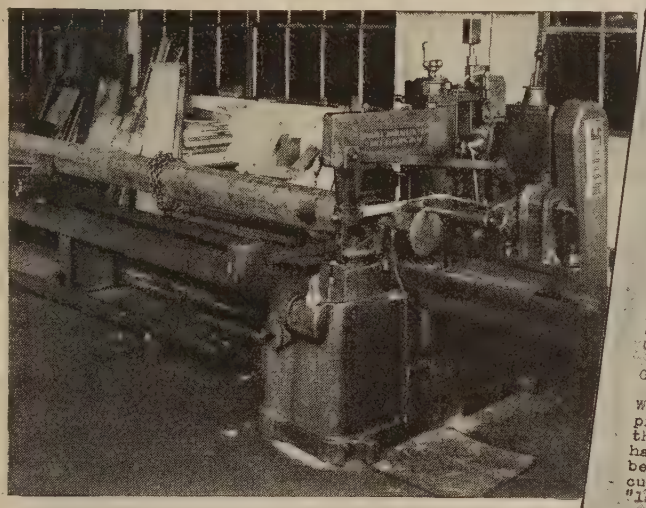
# WHICH IS BETTER FOR YOU, HACK SAWS OR BAND SAWS?

Reading Chain & Block Corporation found the answer by contacting the MARVEL field engineer. Only a MARVEL engineer could analyze this problem without bias because only MARVEL makes both hack saws and band saws. As a result, Reading bought three different types to most efficiently handle their metal sawing. A No. 6A machine for production cutting of identical pieces, a No. 4B machine for fast, accurate, miscellaneous cutting, and a No. 8 band saw machine for cutting of structurals, mitering, and other miscellaneous work.

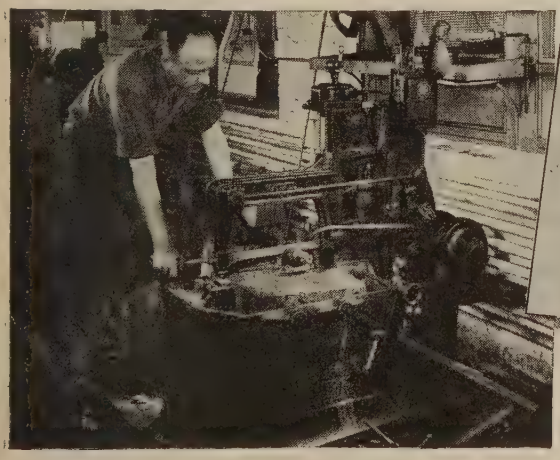
Whatever your metal sawing problem, there is among MARVEL'S 11 different series of sawing machines, a saw or saws that will exactly meet your needs. Your local MARVEL Engineer will gladly study your sawing problems, make recommendations and quote prices.



No. 8 MARVEL Metal Cutting Band Saw. This most versatile saw takes work up to 18" x 18", mortises, miters or roughs to shape.



No. 6A MARVEL Production Saw (world's fastest) automatically feeds, measures and cuts off identical pieces from nested or single bars up to 6" x 6" cross section.



No. 4B MARVEL Hign Speed Saw is a moderate priced, very fast 6" x 6" capacity saw. Here it ideally meets the requirements of the maintenance department.

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GENERAL OFFICES
READING, PA., U.S.A.

October 24, 1947

Armstrong-Blum Mfg.Company
5700 West Bloomingdale Avenue
Chicago, 39, Illinois

Gentlemen:

We have in our shop three Marvel Saws which are used all day in production work for the cutting of materials in connection with the manufacture of hoists and cranes. Since these three saws have been used in our plant the cost of cutting materials has been greatly reduced, and the speed at which the materials are cut has been increased to such a point that we no longer have "lay overs" due to the lack of materials.

We wish to assure you at this time that when we need more automatic saws in our plant, we will definitely give you first consideration to install the Marvel Saws in our plant.

Whenever it has been necessary for any repair service, or engineering service, to be applied to these saws, we have never had to wait or inquire the second time for these services. That is one thing that has kept us in production to this date.

Again assuring you that your services and attentions to our requirements have been very satisfactory, we remain,

Very truly yours,

READING CHAIN & BLOCK CORP.

Fred M. Howard

Fred M. Howard
Purchasing Agent

FMH:akh

MARVEL Metal Cutting SAWS

**ARMSTRONG-BLUM MFG. CO.**

"The Hack Saw People"

**5700 Bloomingdale Ave. Chicago 39, U.S.A**

## Some Producers Seen Skeptical of October Stockpiling Meetings

*New York*

• • • **The October** series of meetings to be held on the stockpiling of nonferrous metals has caused concern on the part of some producers lest there be an attempt to obtain commitments for additional allocations from each producer of copper, lead and zinc despite the present tight market conditions. Producers feel that the government position on stockpiling is being toughened without any regard for its impact on the civilian needs and its effect on the domestic metal markets.

It has been learned that the copper meeting will be held on Oct 12, Columbus Day, the lead meeting on Oct. 19 and zinc on Oct. 20. Invitations have been sent out on a company basis.

Copper, lead and zinc are still in very heavy demand by domestic and foreign consumers. Some observers believe that continued demand for these metals in the face of declining demand for certain types of manufactured products is due in part to the fear of many consumers that they might be caught short of metal due to the stockpiling program. Nevertheless, it is recognized that the strikes at lead and zinc operations have played an important part in constricting supplies.

St. Joseph Lead Co. estimates that it will be able to take care of 60 pct of its customers' normal requirements in October, and expects to be in full production for November deliveries. The workers went back at the Herculaneum smelter on Monday. At the Federal smelter they expect to be in full operation within two weeks. In the meantime stocks on hand will be used to fill some October shipments. There is no change in the American Zinc, Lead & Smelting Co. strike.

### Fear There May Be Attempts To Get Commitments For Further Allocations

° ° °

Consumers of lead and zinc are, meanwhile, as badly off for metal as they have been since the strikes began. RFC stocks will contain some High Grade that has not been transferred to the permanent stockpile. There is no Prime Western, however, and only High Grade is being sold to galvanizers and brass mills by RFC. Zinc producers are aroused over the characterization of the stockpiles now existing as token tonnages while they are conscious of the fact that some 250,000 tons of zinc are now being held by the government.

The copper market is very firm for nearby deliveries, and some tonnages have been placed as far ahead as March. Both wire mills and brass mills are ordering heavily despite the reduction in their order backlogs.

The ingot market continues to idle along with brass and aluminum foundries out of the market. Although the published prices of most brass ingot makers have not been reduced for months, it is understood that ingots are being sold from 1½¢ to 2¢ under these prices. One ingot producer in Philadelphia who regularly announces going prices is from 1¾¢ to 2½¢ below other published prices. These lower prices are f.o.b. plant, Philadelphia.

Declines were registered in the aluminum ingot market during the week to the extent of ¾¢ per lb. Large foundries are reported to have put in heavy inventories early in the year when it became apparent that all aluminum products were going to grow tighter and more expensive. Smaller foundries are suffering from lack of business and are not reordering.

The scrap market is inactive, except in lead where the current range in smelting charges is rereported at $5 to $15 a ton.

### Nonferrous Metals Prices

| | Sept. 22 | Sept. 23 | Sept. 24 | Sept. 25 | Sept. 27 | Sept. 28 |
|---|---|---|---|---|---|---|
| Copper, electro, Conn. | 23.50 | 23.50 | 23.50 | 23.50 | 23.50 | 23.50 |
| Copper, Lake, Conn. | 23.625 | 23.625 | 23.625 | 23.625 | 23.625 | 23.625 |
| Tin, Straits, New York | $1.03 | $1.03 | $1.03 | $1.03 | $1.03 | $1.03 |
| Zinc, East St. Louis | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 |
| Lead, St. Louis | 19.30 | 19.30 | 19.30 | 19.30 | 19.30 | 19.30 |

## To Build Detinning Plant in Baltimore

*New York*

• • • **The formation** of a new company to carry on detinning operations from tinplate scrap at Baltimore has been announced by Frank J. O'Brien, president. The company, the Tin & Chemical Corp., is ready to begin construction of a detinning plant in the Curtis Bay area with the expectation that it may be ready for operation in the spring.

Officers of the company, in addition to Mr. O'Brien, include I. D. Shapiro, vice-president and general manager; Walton S. Smith, vice-president; Hubert E. Rogers, secretary; John F. Condon, assistant secretary; Alexander Rogers, treasurer; and Alexander Papi, assistant treasurer.

Directors of the company are John F. Condon, D. W. Figgis, Hubert E. Rogers, Jacob S. Shapiro, I. D. Shapiro, and Frank J. O'Brien.

The officers of the company include four officials of Metal & Thermit Corp. which operates a detinning plant at Carteret, N. J. Mr. I. D. Shapiro is president of the Standard Metal Refining Co., operating a detinning plant in Baltimore. D. W. Figgis is president of the American Can Co.

# Primary Metals

*(Cents per lb, unless otherwise noted)*

| | |
|---|---|
| Aluminum, 99+%, 10,000 lb, freight allowed | 16.00 to 17.00 |
| Aluminum pig | 15.00 to 16.00 |
| Antimony, American, Laredo, Tex. | 35.00 |
| Beryllium copper, 3.75-4.25% Be dollars per lb contained Be | $20.50 |
| Beryllium aluminum 5% Be, dollars per lb contained Be | $40.00 |
| Cadmium, del'd | $1.90 |
| Cobalt, 97-99% (per lb) | $1.65 to $1.72 |
| Copper electro, Conn. Valley | 23.50 |
| Copper, lake, Conn. Valley | 23.625 |
| Gold, U. S. Treas., dollars per oz. | $35.00 |
| Indium, 99.8%, dollars per troy oz. | $2.25 |
| Iridium, dollars per troy oz. | $110 to $120 |
| Lead, St. Louis | 19.30 |
| Lead, New York | 19.50 |
| Magnesium, 99.8+%, f.o.b. Freeport, Tex. | 20.50 |
| Magnesium, sticks, carlots | 34.50 |
| Mercury, dollars per 76-lb flask, f.o.b. New York | $75 to $78 |
| Nickel, electro, f.o.b. New York | 42.90 |
| Palladium, dollars per troy oz. | $24.00 |
| Platinum, dollars per troy oz. | $93 to $96 |
| Silver, New York, cents per oz. | 75.25 |
| Tin, Grade A, New York | $1.03 |
| Zinc, East St. Louis | 15.00 |
| Zinc, New York | 15.65 |
| Zirconium copper, 20 pct Zr, per lb contained Zr. | $8.75 |

# Remelted Metals

## Brass Ingot

*(Published prices, cents per lb delivered, carloads)*

| | | |
|---|---|---|
| 85-5-5-5 ingot | | |
| No. 115 | 19.50* | 22.00 |
| No. 120 | 19.00* | 21.50 |
| No. 123 | 18.50* | 21.00 |
| 80-10-10 ingot | | |
| No. 305 | .... | 27.25 |
| No. 315 | .... | 24.25 |
| 88-10-2 ingot | | |
| No. 210 | .... | 33.00 |
| No. 215 | .... | 31.00 |
| No. 245 | 24.00* | 25.75 |
| Yellow ingot | | |
| No. 405 | 15.75* | 17.50 |
| Manganese bronze | | |
| No. 421 | .... | 23.00 |

* F.o.b. Philadelphia.

## Aluminum Ingot

*(Cents per lb, lots of 30,000 lb)*

| | |
|---|---|
| 95-5 aluminum-silicon alloys | |
| 0.30 copper, max. | 26.50–27.00 |
| 0.60 copper, max. | 26.25–26.75 |
| Piston alloys (No. 122 type) | 23.50–24.00 |
| No. 12 alum. (No. 2 grade) | 22.75–23.25 |
| 108 alloy | 22.75–23.25 |
| 195 alloy | 22.75–23.50 |
| 13 alloy | 25.25–26.25 |
| AXS-679 | 23.25–23.75 |

**Steel deoxidizing aluminum, notch-bar granulated or shot**

| | |
|---|---|
| Grade 1—95 pct-95½ pct | 23.75–24.75 |
| Grade 2—92 pct-95 pct | 23.25–24.25 |
| Grade 3—90 pct-92 pct | 22.25–23.25 |
| Grade 4—85 pct-90 pct | 22.00–22.25 |

# Electroplating Supplies

***Anodes***

*(Cents per lb, freight allowed, in 500 lb lots)*

| | |
|---|---|
| Copper | |
| Cast, oval, 15 in. or longer | 40⅛ |
| Electrodeposited | 34⅜ |
| Rolled, oval, straight, delivered | 37.34 |
| Ball anodes | 38⅜ |
| Brass, 80-20 | |
| Cast, oval, 15 in. or longer | 35⅞ |
| Zinc, oval, 99.99 | 22.50 |
| Ball anodes | 20.50 |
| Nickel 99 pct plus | |
| Cast | 59.00 |
| Rolled, depolarized | 60.00 |
| Cadmium | $2.00 |
| Silver 999 fine, rolled, 100 oz. lots, per troy oz. | 83 |

***Chemicals***

*(Cents per lb, f.o.b. shipping point)*

| | |
|---|---|
| Copper cyanide, 100 lb drum | 46.00 |
| Copper sulfate, 99.5, crystals, bbls. | 9.35 |
| Nickel salts, single or double, 100 lb bags, frt. allowed | 17.50 |
| Nickel chloride, 300 lb bbl. | 24.50 |
| Silver cyanide, 100 oz. lots, per oz. | 64⅛ |
| Sodium cyanide, 96 pct domestic 100 lb drums | 16.00 |
| Zinc cyanide, 100 lb drums | 37.00 |
| Zinc sulfate, 89 pct, granules, bbls, monohydrated, frt. allowed | 7.90 |

# Mill Products

## Aluminum

*(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)*

**Flat Sheet:** 0.188 in., 2S, 3S, 25.7¢; 4S, 61S-O, 27.8¢; 52S, 29.9¢; 24S-O, 24S-OAL, 28.8¢; 75S-O, 75S-OAL, 35.3¢. 0.081 in., 2S, 3S, 26.8¢; 4S, 61S-O, 29.2¢; 52S, 31.3¢; 24S-O, 24S-OAL, 29.9¢; 75S-O, 75S-OAL, 37.0¢. 0.032 in., 2S, 3S, 28.5¢; 4S, 61S-O, 32.5¢; 52S, 35.2¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 46.6¢.

**Plate:** ¼ in. and heavier: 2S, 3S, 22.8¢; 4S-F, 25.0¢; 52S, 26.1¢; 61S-O, 25.6¢; 24S-F, 24S-FAL, 26.1¢; 75S, 75S-AL, 32.9¢.

**Extruded Solid Shapes:** Shape factors 1 to 4; 31¢ to 59¢; 11 to 13, 31.9¢ to 69¢; 23 to 25, 33.4¢ to 90¢; 35 to 37, 40.8¢ to $1.25; 47 to 49, 58.7¢ to $1.84.

**Extruded Round Rod, Square, Hex, Octagonal Bar:** ¼ in. and over, 27¢ to 38¢; ½ to ¾ in., 28¢ to 40.5¢; ⅝ to ½ in., 29¢ to 43¢; ¼ to ⅜ in., 30¢ to 46.5¢; 3/16 to 7/32 in., 32.5¢ to 53.5¢; 9/64 to 5/32 in., 35.5¢ to 62¢.

**Rolled Rod:** 1.064 to 4.5 in., 2S, 3S, 33¢ to 29.5¢; Cold-finished rod, 0.375 to 3.5 in., 2S, 3S, 35.5¢ to 31¢.

**Screw Machine Stock:** Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 48¢ to 34¢; cold-finished ⅜ to 1½ in., 11S-T3, 37.5¢ to 34.5¢; ⅜ to 2 in., R317-T4, 33¢ to 30¢; rolled, 1 9/16 to 3 in., 11S-T3, 34.5¢ to 31.5¢; 2⅛ to 3⅜ in., R317-T4, 29.5¢ to 28.5¢. Base 5000 lb.

**Drawn Wire:** coiled, 0.051 to 0.374 in.: 2S, 35¢ to 25.5¢; 52S, 43¢ to 31¢; 56S, 45.5¢ to 37¢; 17S-T4, 49¢ to 33.5¢; 61S-T4, 43.5¢ to 33¢; 75S-T6, 75¢ to 54¢.

## Magnesium

*(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)*

**Sheet and Plate:** Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

**Extruded Round Rod:** M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

**Extruded Square, Hex. Bar:** M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

**Extruded Solid Shapes, Rectangles:** M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

**Extruded Round Tubing:** M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ⅞ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

## Nickel and Monel

*(Cents per lb, f.o.b. mill)*

| | Nickel | Monel |
|---|---|---|
| Sheets, cold-rolled | 60 | 47 |
| Strip, cold-rolled | 66 | 50 |
| Rods and shapes | | |
| Hot-rolled | 56 | 45 |
| Cold-drawn | 56 | 45 |
| Angles, hot-rolled | 56 | 45 |
| Plates | 58 | 46 |
| Seamless tubes | 89 | 80 |
| Shot and blocks | .. | 40 |

## Copper, Brass, Bronze

*(Cents per pound, freight prepaid on 200 lb)*

| | Extruded Shapes | Rods | Sheets |
|---|---|---|---|
| Copper | 36.78 | .... | 37.18 |
| Copper, hot-rolled | .... | 33.28 | .... |
| Copper, drawn | .... | 34.28 | .... |
| Low brass | 38.07* | 34.85 | 35.16 |
| Yellow brass | 36.76* | 33.44 | 33.75 |
| Red brass | 38.55* | 35.33 | 35.64 |
| Naval brass | 33.92 | 32.67 | 38.61 |
| Leaded brass | .... | 28.30 | .... |
| Commercial bronze | 39.29* | 36.32 | 36.63 |
| Manganese bronze | 37.51 | 36.01 | 42.11 |
| Phosphor bronze, 5 pct | 57.80* | 56.30 | 56.05 |
| Muntz metal | 33.47 | 32.22 | 36.66 |
| Everdur, Herculoy, Olympic, etc. | 40.43 | 40.67 | 41.73 |
| Nickel silver, 10 pct | .... | 46.42 | 44.20 |
| Architectural bronze | .... | .... | 32.33 |

* Seamless tubing.

# Scrap Metals

## Brass Mill Scrap

*(Cents per pound; add 1¢ per lb for shipments of 15,000 or more)*

| | Heavy | Turnings |
|---|---|---|
| Copper | 21⅛ | 20⅜ |
| Yellow brass | 18 | 17⅛ |
| Red brass | 19¾ | 19 |
| Commercial bronze | 19¾ | 19 |
| Manganese bronze | 17¾ | 16⅞ |
| Leaded brass rod ends | 17¾ | |

## Custom Smelters' Scrap

*(Cents per pound, carload lots, delivered to refinery.)*

| | |
|---|---|
| No. 1 copper wire | 20.00 |
| No. 2 copper wire | 19.00 |
| Light copper | 18.00 |
| Refinery brass | 18.00 |

* Dry copper content.

## Ingot Makers' Scrap

*(Cents per pound, carload lots, delivered to producer.)*

| | |
|---|---|
| No. 1 copper, wire | 19.25 |
| No. 2 copper, wire | 18.25 |
| Light copper | 17.25 |
| No. 1 composition | 16.00 |
| No. 1 comp. turnings | 15.50 |
| Rolled brass | 12.00 |
| Brass pipe | 12.50 |
| Radiators | 13.25 |
| Heavy yellow brass | 11.50 |
| *Aluminum* | |
| Mixed old cast | 10.50 |
| Mixed old clips | 10.50 |
| Mixed turnings, dry | 10.00 |
| Pots and pans | 11.00 |
| Low copper | 11.50 |

## Dealers' Scrap

*(Dealer's buying prices, f.o.b. New York in cents per pound)*

### Copper and Brass

| | |
|---|---|
| No. 1 heavy copper and wire | 17½—17¾ |
| No. 2 heavy copper and wire | 16½—16¾ |
| Light copper | 15½—16 |
| Auto radiators (unsweated) | 10¾—11¼ |
| No. 1 composition | 13¼—13½ |
| No. 1 composition turnings | 12¾—13 |
| Clean red car boxes | 9¾—10 |
| Cocks and faucets | 9¾—10 |
| Mixed heavy yellow brass | 8¼— 8¾ |
| Old rolled brass | 9¾—10 |
| Brass pipe | 10½—11 |
| New soft brass clippings | 13¼—14 |
| Brass rod ends | 11 —11½ |
| No. 1 brass rod turnings | 10¼—10¾ |

### Aluminum

| | |
|---|---|
| Alum. pistons and struts | 7½— 8 |
| Aluminum crankcases | 9 — 9½ |
| 2S aluminum clippings | 11½—12 |
| Old sheet & utensils | 9 — 9½ |
| Borings and turnings | 4½— 5 |
| Misc. cast aluminum | 9 — 9½ |
| Dural clips (24S) | 9 — 9½ |

### Zinc

| | |
|---|---|
| New zinc clippings | 10 —10½ |
| Old zinc | 7¾— 8¼ |
| Zinc routings | 4 — 4½ |
| Old die cast scrap | 4½— 5 |

### Nickel and Monel

| | |
|---|---|
| Pure nickel clippings | 21 —22 |
| Clean nickel turnings | 16 —17 |
| Nickel anodes | 21 —22 |
| Nickel rod ends | 21 —22 |
| New Monel clippings | 14 —15 |
| Clean Monel turnings | 10 —11 |
| Old sheet Monel | 12½—13 |
| Old Monel castings | 10 —11 |
| Inconel clippings | 10 —11 |
| Nickel silver clippings, mixed | 8 — 8½ |
| Nickel silver turnings, mixed | 6½— 7 |

### Lead

| | |
|---|---|
| Soft scrap lead | 17½—18 |
| Battery plates (dry) | 11¼—11¾ |

### Magnesium Alloys

| | |
|---|---|
| Segregated solids | 8 — 9 |
| Castings | 4½— 5½ |

### Miscellaneous

| | |
|---|---|
| Block tin | 82 —84 |
| No. 1 pewter | 65 —67 |
| No. 1 auto babbitt | 51 —53 |
| Mixed common babbitt | 14¾—15¼ |
| Solder joints | 19¾—20¼ |
| Siphon tops | 50 —52 |
| Small foundry type | 20 —20½ |
| Monotype | 19 —19½ |
| Lino. and stereotype | 18 —18½ |
| Electrotype | 16½—17 |
| New type shell cuttings | 15 —15½ |
| Hand picked type shells | 6½— 7 |
| Lino. and stereo dross | 9½—10 |
| Electro dross | 6½— 7 |

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USS

UNITED STATES STEEL

# Market Static; Softness in Some Areas

*New York*

• • • **Market conditions** were static this week, pricewise and as far as movement of shipments was concerned.

Mill inventories at large mill consuming points were reported to be at the highest levels seen in recent months. None of these mills are stopping shipments, however, despite the fact they are getting tougher on their inspection procedures.

The overall situation has given the market as a whole a softening effect. In Buffalo a leading consumer was probing for the softness by bidding at below current price levels.

• • • Reasons for New York Central R. R. Co.'s abandonment of earmarked scrap sales appears on p. 96 of this issue of THE IRON AGE—Ed.

No. 1 cupola cast has been removed from the quotations in Detroit and replaced with machinery cast selling at $62 to $64 and mixed yard cast going at $57 to $59. In Buffalo charging box cast, stove auto cast and cast iron carwheels have been removed from the quoted list because of the lack of differentiation among many of the cast grades in current sales.

**Mixed feelings** exist about price trends in the near future. Some sources are looking for prices to take a downward movement and point to numerous weak spots, but others cannot see a move in that direction with winter coming up.

Cast iron grades are for the most part spotty. Selling goes on at above and below current price levels but generally the market remains firm on these grades.

While the short term picture is brighter as far as supply is concerned, the prospects for long range optimism are not nearly as good. Mills will still have to keep plugging despite an opportunity to be selective at present.

•

PITTSBURGH—Openhearth scrap supply prospects look good in this district for the next few months. Some of the big mills have large stocks on hand. Carnegie-Illinois' German scrap is said to be coming in as planned and its quality is excellent. Prices for openhearth grades appear to have reached a level above which they are unlikely to rise for some time though they will be tested when the snow flies. In short—while long range supply prospects are not bright the short term picture is better than it has been for a long time. Price resistance has developed in the railroad specialties. They sold at the quoted prices during the past week but it is understood that there was little or no profit in the deals for the broker. Low phos is quotable up 50¢.

•

CHICAGO—Mill inventories in this area are the highest in years. Most buyers are holding back on accepting dealer scrap unless the quality is exceptionally good. All mills continue, however, to take customer scrap. Under such conditions, some observers are beginning to wonder what is keeping the price up. Reliable sources say the mills are about ready to offer lower prices. They think the dealers will accept less in preference to not making any shipments at all. Brokers don't agree. They say scrap cannot come down with winter ahead. To get back to now—the main prop under present scrap prices in this area is conversion. Metal consumers are buying scrap in order to get ingots and eventually end products. They are buying a lot of scrap and they are willing to pay the price.

•

PHILADELPHIA—Some mills that had been out of the market for heavy melting grades came back in last week. Mills generally are reported to be in a comfortable scrap position, particularly in view of some 50,000 tons of foreign scrap due to be unloaded in this area in the next 30 to 60 days. The heavy melting market is still firm at quoted prices, however. Turnings are not coming out very fast and machine shop and shovelings are quoted 50¢ higher. At the same time mills are turning fussy on shovelings. Railroad specialties are quoted $1 higher as the result of the latest Reading Co. sale at $55. Electric furnaces are buying low phos 50¢ above the quoted prices. Chemical borings prices are quoted in the range of $43 to $45 with all factors actively buying.

•

CLEVELAND—There has been little change in the market here or in the Valley. Demand is strong and supply is relatively weak. Shipments have improved during the past few days, but not enough to permit major consumers to put much on the ground. Most mills that are fairly comfortable are reluctant to drop out of the market, an action which serves to sustain the markets' strength. Except for the specialty grades, the high prices are somewhat weaker because many of the converters are apparently pretty well filled up for the time being.

•

DETROIT—The market in Detroit is holding at current levels for openhearth grades. Meanwhile, the price of cast iron grades is also firm, despite spotty buying. In order to reflect conditions as they have developed here and to bring Detroit scrap classifications in line with quotations in other cities, the No. 1 cupola grade has been broken down and reclassified as machinery cast and mixed yard cast. It is recognized that scattered sales of cast are being made here at prices higher than those quoted; it is likewise true that some buys of good cast go at levels below the present prices.

•

CINCINNATI — Foundry grades are weaker this week as demand for this material is very spotty, and indications are that new orders will be put out at lower prices. Openhearth material is moving well, and all major consumers are trying to get as much as possible on the ground. Blast furnace grades are moving fairly well with clean borings in strongest demand. Market conditions generally in this area are tending toward a somewhat weaker market, and as long as mills stay on the formula and if converters stay out, these conditions will probably hold.

•

NEW YORK—The market continues firm in most quarters with shipments moving a little better than during the past weeks. Only change in prices was a $1 drop in unstripped motor blocks which are going at $43.50 to $44.50. Clean auto cast has been dropped from the list of quoted grades due to a lack of such a grade on the market. Chemical borings continue to move well while demand is holding up.

•

BUFFALO—A $2 advance in cast scrap featured the market as a leading foundry purchased a good tonnage of mixed yard stuff at $66. No new business was reported in openhearth items and the air was filled with rumors, including one that a major mill had bought at $2 over the formula. This was denied by the interest in question. At the same time a leading consumer was probing for soft spots with below ceiling bids on various grades. Approximately 5000 tons of scrap was received by lake from Duluth and 1500 tons by barge from New York.

•

BIRMINGHAM — Demand for openhearth scrap still is strong here but the undertone is slightly weaker for electric furnace material. Mills are obtaining their consumption of steel but no easing has occurred in the terrifically tight cast market.

•

ST. LOUIS—While steel mills and foundries continue to buy scrap iron, there is a feeling of uncertainty among both consumers and sellers as to the future. However, prices are unchanged.

•

SEATTLE—This market is still turbulent. While buyers are listing No. 1 and No. 2 heavy melting as selling for $27.50 per gross ton, average price seems to be about $30 per ton. Cupola No. 1 cast has gone wild on the market of late, however, with prices ranging between $50 and $56 per gross ton.

# IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

## PITTSBURGH

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $42.50 to $43.00 |
| RR. hvy. melting | 43.50 to 44.00 |
| No. 2 hvy. melting | 42.50 to 43.00 |
| RR. scrap rails | 57.50 to 58.50 |
| Rails 2 ft and under | 62.00 to 62.50 |
| No. 1 comp'd bundles | 42.50 to 43.00 |
| Hand bdld. new shts. | 42.50 to 43.00 |
| Hvy. axle turn. | 45.50 to 46.50 |
| Hvy. steel forge turn. | 45.50 to 46.50 |
| Mach. shop turn. | 37.50 to 38.00 |
| Shoveling turn. | 39.50 to 40.00 |
| Mixed bor. and turn. | 37.50 to 38.00 |
| Cast iron borings | 39.50 to 40.00 |
| No. 1 mach. cast | 69.50 to 70.50 |
| Mixed yard cast | 63.50 to 64.50 |
| Hvy. breakable cast. | 58.00 to 59.00 |
| Malleable | 76.00 to 77.00 |
| RR. knuck. and cup. | 60.00 to 61.00 |
| RR. coil springs | 60.00 to 61.00 |
| RR. leaf springs | 60.00 to 61.00 |
| Rolled steel wheels | 60.00 to 61.00 |
| Low phos. | 50.00 to 50.50 |

## CHICAGO

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $41.50 to $42.00 |
| No. 2 hvy. melting | 41.50 to 42.00 |
| No. 1 bundles | 41.50 to 42.00 |
| No. 2 dealers' bundles | 41.50 to 42.00 |
| Bundled mach. shop turn. | 39.50 to 40.00 |
| Galv. bundles | 39.50 to 40.00 |
| Mach. shop turn. | 36.50 to 37.00 |
| Short shov. turn. | 38.50 to 39.00 |
| Cast iron borings | 37.50 to 38.00 |
| Mix. borings and turn. | 36.50 to 37.00 |
| Low phos. hvy. forge | 51.00 to 52.00 |
| Low phos. plates | 49.00 to 50.00 |
| No. 1 RR. hvy. melt. | 44.25 to 48.50 |
| Rerolling rails | 64.00 to 67.75 |
| Miscellaneous rails | 62.00 to 63.00 |
| Angles & splice bars | 57.50 to 58.00 |
| Locomotive tires, cut | 59.00 to 60.00 |
| Cut bolster & side frames | 50.00 to 51.00 |
| Standard stl. car axles | 75.00 to 77.00 |
| No. 3 steel wheels | 56.00 to 57.00 |
| Couplers and knuckles | 56.00 to 57.00 |
| Rails, 2 ft and under | 64.00 to 67.00 |
| Malleable | 82.00 to 83.00 |
| No. 1 mach. cast. | 70.00 to 72.00 |
| No. 1 agricul. cast. | 63.00 to 68.00 |
| Heavy breakable cast. | 63.00 to 64.00 |
| RR. grate bars | 66.00 to 67.00 |
| Cast iron brake shoes | 57.00 to 58.00 |
| Cast iron car wheels | 62.00 to 63.00 |

## CINCINNATI

**Per gross ton, f.o.b. cars:**

| | |
|---|---|
| No. 1 hvy. melting | $40.00 to $41.00 |
| No. 2 hvy. melting | 40.00 to 41.00 |
| No. 1 bundles | 40.00 to 41.00 |
| No. 2 bundles | 40.00 to 41.00 |
| Mach. shop turn. | 35.00 to 36.00 |
| Shoveling turn. | 37.00 to 38.00 |
| Cast iron borings | 36.00 to 37.00 |
| Mixed bor. & turn. | 35.00 to 36.00 |
| Low phos., 18 in. under | 48.00 to 49.00 |
| No. 1 cupola cast. | 66.00 to 68.00 |
| Hvy. breakable cast | 59.00 to 60.00 |
| Rails 18 in. and under | 63.00 to 65.00 |
| Rails random length | 57.00 to 59.00 |
| Drop broken | 71.00 to 72.00 |

## BOSTON

**Brokers' buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $37.00 to $38.90 |
| No. 2 hvy. melting | 35.50 to 36.00 |
| Nos. 1 and 2 bundles | 35.50 to 36.00 |
| Bushelings | 35.50 to 36.00 |
| Shoveling turn. | 31.40 to 32.50 |
| Machine shop turn. | 29.40 to 31.50 |
| Mixed bor. and turn. | 29.40 to 31.50 |
| Cl'n cast chem. bor. | 38.50 to 39.00 |
| No. 1 machinery cast. | 64.00 to 65.00 |
| No. 2 machinery cast. | 59.00 to 60.00 |
| Heavy breakable cast. | 53.50 to 54.50 |
| Stove plate | 52.50 to 53.50 |

## DETROIT

**Per gross ton, brokers' buying prices f.o.b. cars:**

| | |
|---|---|
| No. 1 hvy. melting | $38.00 |
| No. 2 hvy. melting | 38.00 |
| No. 1 bundles | 38.00 |
| New bushelings | 38.00 |
| Flashings | 38.00 |
| Mach. shop turn. | $32.50 to 33.00 |
| Machinery cast | 62.00 to 64.00 |
| Mixed yard cast | 57.00 to 59.00 |
| Shoveling turn. | 34.50 to 35.00 |
| Cast iron borings | 33.50 to 34.00 |
| Mixed bor. & turn. | 34.50 to 35.00 |
| Low phos. plate | 42.50 to 43.00 |
| Heavy breakable cast. | 53.00 to 57.00 |
| Stove plate | 56.00 to 57.00 |
| Automotive cast. | 63.00 to 65.00 |

## PHILADELPHIA

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $44.50 to $45.50 |
| No. 2 hvy. melting | 41.00 to 41.50 |
| No. 1 bundles | 44.50 to 45.50 |
| No. 2 bundles | 41.00 to 41.50 |
| Mach. shop turn. | 37.00 to 38.00 |
| Shoveling turn. | 38.50 to 39.00 |
| Mixed bor. and turn. | 36.50 to 37.50 |
| Clean cast chemical bor. | 43.00 to 45.00 |
| No. 1 machinery cast. | 65.00 to 66.00 |
| No. 1 mixed yard cast. | 61.00 to 62.00 |
| Hvy. breakable cast | 62.00 to 63.00 |
| Clean auto cast. | 65.00 to 66.00 |
| Hvy. axle forge turn. | 46.00 to 47.00 |
| Low phos. plate | 51.00 to 52.00 |
| Low phos. punchings | 51.00 to 52.00 |
| Low phos. bundles | 48.00 to 49.00 |
| RR. steel wheels | 54.00 to 55.00 |
| RR. coil springs | 54.00 to 55.00 |
| RR. malleable | 78.00 to 80.00 |
| Cast iron carwheels | 68.00 to 70.00 |

## ST. LOUIS

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $43.00 to $44.00 |
| No. 2 hvy. melting | 40.00 to 41.00 |
| Bundled sheets | 40.00 to 41.00 |
| Mach. shop turn. | 35.00 to 36.00 |
| Shoveling turnings | 37.00 to 38.00 |
| Locomotive tires, uncut | 49.00 to 50.00 |
| Mis. std. sec. rails | 54.00 to 56.00 |
| Steel angle bars | 54.00 to 55.00 |
| Rails 3 ft and under | 58.00 to 60.00 |
| RR. steel springs | 51.00 to 52.00 |
| Steel car axles | 56.00 to 57.00 |
| Grate bars | 59.00 to 60.00 |
| Brake shoes | 59.00 to 60.00 |
| Malleable | 73.00 to 75.00 |
| Cast iron car wheels | 60.00 to 61.00 |
| No. 1 machinery cast. | 66.00 to 68.00 |
| Hvy. breakable cast. | 59.00 to 60.00 |

## BIRMINGHAM

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $40.00 |
| No. 2 hvy. melting | 40.00 |
| No. 2 bundles | 40.00 |
| No. 1 bunsheling | 40.00 |
| Long turnings | $27.50 to 28.50 |
| Shoveling turnings | 29.50 to 30.50 |
| Cast iron borings | 29.50 |
| Bar crops and plate | 44.00 to 45.00 |
| Structural and plate | 44.00 to 45.00 |
| No. 1 cupola cast. | 64.00 to 67.00 |
| Stove plate | 63.00 to 64.00 |
| No. 1 RR. hvy. melt. | 41.00 |
| Steel axles | 51.00 to 52.00 |
| Scrap rails | 44.00 to 45.00 |
| Rerolling rails | 57.00 to 60.00 |
| Angles & splice bars | 51.00 to 53.00 |
| Rails 3 ft & under | 52.00 to 55.00 |
| Cast iron carwheels | 50.00 to 55.00 |

## YOUNGSTOWN

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $42.50 to $43.00 |
| No. 2 hvy. melting | 42.50 to 43.00 |
| Mach. shop turn. | 37.50 to 38.00 |
| Short shov. turn. | 39.00 to 40.00 |
| Cast iron borings | 38.00 to 39.00 |
| Low phos. | 47.50 to 48.00 |

## NEW YORK

**Brokers' buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $38.50 to $39.00 |
| No. 2 hvy. melting | 37.00 |
| No. 2 bundles | 37.00 |
| Mach. shop turn. | 31.50 to 32.00 |
| Mixed bor. & turn. | 31.50 to 32.00 |
| Shoveling turnings | 33.50 to 34.00 |
| Machinery cast. | 59.00 to 60.00 |
| Mixed yard cast | 57.00 to 58.00 |
| Heavy breakable cast. | 56.00 to 57.00 |
| Charging box cast. | 56.00 to 57.00 |
| Unstrp. motor blks. | 53.50 to 54.50 |
| Cl'n cast chem. bor. | 38.50 to 39.50 |

## BUFFALO

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $47.00 to $49.00 |
| No. 2 hvy. melting | 41.75 to 42.25 |
| No. 1 bundles | 41.75 to 42.25 |
| No. 2 bundles | 41.75 to 42.25 |
| No. 1 busheling | 41.75 to 42.25 |
| Mach. shop turn. | 36.75 to 37.25 |
| Shoveling turn. | 37.25 to 38.00 |
| Cast iron borings | 37.75 to 38.25 |
| Mixed bor. and turn. | 36.75 to 37.25 |
| Clean auto. cast. | 65.00 to 66.00 |
| Mixed cupola cast. | 65.00 to 66.00 |
| Stove plate | 64.00 to 65.00 |
| RR. malleable | 70.00 to 75.00 |
| Small indus. malleable | 47.00 to 49.00 |
| Low phos. plate | 48.00 to 50.00 |
| Scrap rails | 58.00 to 60.00 |
| Rails 3 ft & under | 63.00 to 64.00 |
| RR steel wheels | 58.00 to 60.00 |
| RR. coil & leaf spgs. | 58.00 to 60.00 |
| RR. knuckles & coup. | 58.00 to 60.00 |

## CLEVELAND

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $42.00 to $42.50 |
| No. 2 hvy. melting | 42.00 to 42.50 |
| No. 1 bundles | 42.00 to 42.50 |
| No. 1 busheling | 42.00 to 42.50 |
| Drop forge flashings | 42.00 to 42.50 |
| Mach. shop turn. | 37.00 to 37.50 |
| Shoveling turn. | 38.50 to 39.50 |
| Steel axle turn. | 42.00 to 42.50 |
| Cast iron borings | 37.50 to 38.50 |
| Mixed bor. & turn. | 36.50 to 37.50 |
| Low phos. 2 ft and under | 47.00 to 47.50 |
| No. 1 machinery cast. | 72.00 to 74.50 |
| Malleable | 79.00 to 81.00 |
| RR. cast. | 76.00 to 77.00 |
| Railroad grate bars | 60.00 to 62.00 |
| Stove plate | 61.00 to 63.00 |
| RR. hvy. melting | 43.00 to 43.50 |
| Rails 3 ft and under | 63.50 to 64.50 |
| Rails 18 in. and under | 65.00 to 66.00 |

## SAN FRANCISCO

**Per gross ton, f.o.b. shipping point:**

| | |
|---|---|
| No. 1 hvy. melting | $27.50 |
| No. 2 hvy. melting | 27.50 |
| No. 2 bales | 27.50 |
| No. 3 bales | 24.50 |
| Mach. shop turn. | 18.00 |
| Elec. fur. 1 ft under | $36.00 to 40.00 |
| No. 1 cupola cast. | 50.00 to 51.00 |
| RR. hvy. melting | 28.50 |
| Rails | 29.00 |

## LOS ANGELES

**Per gross ton, f.o.b. shipping point:**

| | |
|---|---|
| No. 1 hvy. melting | $27.50 |
| No. 2 hvy. melting | 27.50 |
| No. 1 bales | 27.50 |
| No. 2 bales | 27.50 |
| No. 3 bales | 24.50 |
| Mach. shop turn. | 20.00 |
| No. 1 cupola cast. | $45.00 to 50.00 |
| RR. hvy. melting | 28.50 |

## SEATTLE

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 & No. 2 hvy. melt. | $27.50 to $30.00 |
| Elec. fur. 1 ft and under | 36.50 to 40.00 |
| No. 1 cupola cast. | 50.00 to 56.00 |
| RR. hvy. melting | 28.50 |

## HAMILTON, ONT.

**Per gross ton delivered to consumer: Cast grades f.o.b. shipping point:**

| | |
|---|---|
| Heavy melting | $22.00* |
| No. 1 bundles | 22.00* |
| No. 2 bundles | 21.50* |
| Mechanical bundles | 20.00* |
| Mixed steel scrap | 19.00* |
| Mixed borings and turnings | 17.00* |
| Rails, remelting | 23.00* |
| Rails, rerolling | 26.00* |
| Bushelings | 17.00* |
| Bushelings, new fact, prop'd | 21.00* |
| Bushelings, new fact, unprop'd | 16.00* |
| Short steel turnings | 17.00* |
| No. 1 cast | $42.00 to 46.00 |
| No. 2 cast | 35.00 to 37.00 |

*Ceiling Price.

# *There's Life in a Graveyard*

Auto "graveyards" represent a potential source of 4,500,000 tons of scrap annually. With facilities to process 3,000,000 cars, the wrecking industry is only receiving 500,000 cars a year. New equipment is urgently needed by fleet operators, bus and truck companies. They must turn in their overage and obsolete vehicles now. Scrap from every available source is needed to fill steel requirements.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

# Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

*Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.*

| Flat-Rolled Steel: (cents per pound) | Sept. 28, 1948 | Sept. 21, 1948 | Aug. 31, 1948 | Sept. 30 1947 |
|---|---|---|---|---|
| Hot-rolled sheets | 3.26 | 3.26 | 3.26 | 2.80 |
| Cold-rolled sheets | 4.00 | 4.00 | 4.00 | 3.55 |
| Galvanized sheets (10 ga) | 4.40 | 4.40 | 4.40 | 3.95 |
| Hot-rolled strip | 3.265 | 3.265 | 3.265 | 2.80 |
| Cold-rolled strip | 4.063 | 4.063 | 4.063 | 3.55 |
| Plates | 3.42 | 3.42 | 3.42 | 2.95 |
| Plates wrought iron | 7.85 | 7.85 | 7.85 | 6.85 |
| Stains C-R strip (No. 302) | 33.25 | 33.25 | 33.25 | 30.50 |
| **Tin and Terneplate:** (dollars per base box) | | | | |
| Tinplate (1.50 lb) cokes | $6.80 | $6.80 | $6.80 | $5.75 |
| Tinplate, electro (0.50 lb) | 6.00 | 6.00 | 6.00 | 5.05 |
| Special coated mfg. ternes | 5.90 | 5.90 | 5.90 | 4.90 |
| **Bars and Shapes:** (cents per pound) | | | | |
| Merchant bars | 3.37 | 3.37 | 3.37 | 2.90 |
| Cold-finished bars | 3.995 | 3.995 | 3.995 | 3.55 |
| Alloy bars | 3.75 | 3.75 | 3.75 | 3.30 |
| Structural shapes | 3.25 | 3.25 | 3.25 | 2.80 |
| Stainless bars (No. 302) | 28.25 | 28.25 | 28.25 | 26.00 |
| Wrought iron bars | 9.50 | 9.50 | 9.50 | 7.15 |
| **Wire:** (cents per pound) | | | | |
| Bright wire | 4.256 | 4.256 | 4.256 | 3.55 |
| **Rails:** (dollars per 100 lb) | | | | |
| Heavy rails | $3.20 | $3.20 | $3.20 | $2.75 |
| Light rails | 3.55 | 3.55 | 3.55 | 3.10 |
| **Semifinished Steel:** (dollars per net ton) | | | | |
| Rerolling billets | $52.00 | $52.00 | $52.00 | $45.00† |
| Slabs, rerolling | 52.00 | 52.00 | 52.00 | 45.00† |
| Forging billets | 61.00 | 61.00 | 61.00 | 55.00† |
| Alloy blooms, billets, slabs | 63.00 | 63.00 | 63.00 | 66.00† |
| **Wire rod and Skelp:** (cents per pound) | | | | |
| Wire rods | 3.619 | 3.619 | 3.619 | 2.80 |
| Skelp | 3.25 | 3.25 | 3.25 | 2.60 |

† Gross ton

| Pig Iron: (per gross ton) | Sept. 28, 1948 | Sept. 21, 1948 | Aug. 31, 1948 | Sept. 30 1947 |
|---|---|---|---|---|
| No. 2, foundry, Phila. | $51.56 | $51.56* | $49.26 | $41.22 |
| No. 2, Valley furnace | 43.50 | 43.50 | 43.50 | 36.50 |
| No. 2, Southern Cinti | 49.47 | 49.47 | 49.47 | 39.75 |
| No. 2, Birmingham | 43.38 | 43.38 | 43.38 | 34.88 |
| No. 2, foundry, Chicago† | 43.00 | 43.00 | 43.00 | 36.00 |
| Basic del'd Philadelphia | 50.76 | 50.76* | 48.76 | 40.72 |
| Basic, Valley furnace | 43.00 | 43.00 | 43.00 | 36.00 |
| Malleable, Chicago† | 43.50 | 43.50 | 43.50 | 36.50 |
| Malleable, Valley | 43.50 | 43.50 | 43.50 | 36.50 |
| Charcoal, Chicago | 69.55 | 69.55 | 69.55 | 49.49 |
| Ferromanganese‡ | 145.00 | 145.00 | 145.00 | 135.00 |

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ for carlots at seaboard.
* Revised.

| Scrap (per gross ton) | | | | |
|---|---|---|---|---|
| Heavy melt'g steel, P'gh. | $42.75 | $42.75 | $42.75 | $37.75 |
| Heavy melt'g steel, Phila. | 45.00 | 45.00 | 45.00 | 36.75 |
| Heavy melt'g steel, Ch'go | 41.75 | 41.75 | 41.75 | 38.75 |
| No. 1, hy, comp. sh't, Det. | 38.00 | 38.00 | 38.00 | 34.50 |
| Low phos. Young'n | 47.75 | 47.75 | 47.75 | 44.50 |
| No. 1, cast, Pittsburgh | 70.00 | 70.00 | 65.00 | 43.00 |
| No. 1, cast, Philadelphia | 65.50 | 65.50 | 65.50 | 47.50 |
| No. 1, cast, Chicago | 71.00 | 71.00 | 74.50 | 49.50 |
| **Coke, Connellsville:** (per net ton at oven) | | | | |
| Furnace coke prompt | $15.00 | $15.00 | $15.00 | $12.00 |
| Foundry coke, prompt | 17.00 | 17.00 | 17.00 | 13.75 |
| **Nonferrous Metals:** (cents per pound to large buyers) | | | | |
| Copper, electro, Conn. | 23.50 | 23.50 | 23.50 | 21.50 |
| Copper, Lake Conn. | 23.625 | 23.625 | 23.625 | 21.625 |
| Tin, Grade A, New York | $1.03 | $1.03 | $1.03 | 80.00 |
| Zinc, East St. Louis | 15.00 | 15.00 | 15.00 | 10.50 |
| Lead, St. Louis | 19.30 | 19.30 | 19.30 | 14.80 |
| Aluminum, virgin | 16.00 | 16.00 | 16.00 | 15.00 |
| Nickel, electrolytic | 42.90 | 42.90 | 42.90 | 37.67 |
| Magnesium, ingot | 20.50 | 20.50 | 20.50 | 20.50 |
| Antimony, Laredo, Tex. | 35.00 | 35.00 | 35.00 | 33.00 |

# Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

| | FINISHED STEEL (Base Price) | PIG IRON | SCRAP STEEL |
|---|---|---|---|
| Sept. 28, 1948 | 3.75255¢ per lb. | $45.07 per gross ton | $43.16 per gross ton |
| One week ago | 3.75255¢ per lb. | $45.07* per gross ton | $43.16 per gross ton |
| One month ago | 3.75255¢ per lb. | $44.61 per gross ton | $43.16 per gross ton |
| One year ago | 3.18925¢ per lb. | $36.93 per gross ton | $37.75 per gross ton |

* Revised.

| | HIGH | LOW |
|---|---|---|
| 1948 | 3.75325¢ July 27 | 3.22566¢ Jan. 1 |
| 1947 | 3.19541¢ Oct. 7 | 2.87118¢ Jan. 7 |
| 1946 | 2.83599¢ Dec. 31 | 2.54490¢ Jan 1 |
| 1945 | 2.44104¢ Oct. 2 | 2.38444¢ Jan. 2 |
| 1944 | 2.30837¢ Sept. 5 | 2.21189¢ Oct. 5 |
| 1943 | 2.29176¢ | 2.29176¢ |
| 1942 | 2.28249¢ | 2.28249¢ |
| 1941 | 2.43078¢ | 2.43078¢ |
| 1940 | 2.30467¢ Jan. 2 | 2.24107¢ Apr. 16 |
| 1939 | 2.35367¢ Jan. 3 | 2.26689¢ May 16 |
| 1938 | 2.58414¢ Jan. 4 | 2.27207¢ Oct. 18 |
| 1937 | 2.58414¢ Mar. 9 | 2.32263¢ Jan. 4 |
| 1936 | 2.32263¢ Dec. 28 | 2.05200¢ Mar. 10 |
| 1935 | 2.07642¢ Oct. 1 | 2.06492¢ Jan. 8 |
| 1934 | 2.15367¢ Apr. 24 | 1.95757¢ Jan. 2 |
| 1933 | 1.95578¢ Oct. 3 | 1.75836¢ May 2 |
| 1932 | 1.89196¢ July 5 | 1.83901¢ Mar. 1 |
| 1931 | 1.99626¢ Jan. 13 | 1.86586¢ Dec. 29 |
| 1930 | 2.25488¢ Jan. 7 | 1.97319¢ Dec. 9 |
| 1929 | 2.31773¢ May 28 | 2.26498¢ Oct. 29 |

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

| | HIGH | LOW |
|---|---|---|
| 1948 | $45.07 Sept. 14 | $39.58 Jan. 6 |
| 1947 | 37.98 Dec. 30 | 30.14 Jan. 7 |
| 1946 | 30.14 Dec. 10 | 25.37 Jan. 1 |
| 1945 | 25.37 Oct. 23 | 23.61 Jan. 2 |
| 1944 | $23.61 | $23.61 |
| 1943 | 23.61 | 23.61 |
| 1942 | 23.61 | 23.61 |
| 1941 | $23.61 Mar. 20 | $23.45 Jan. 2 |
| 1940 | 23.45 Dec. 23 | 22.61 Jan. 2 |
| 1939 | 22.61 Sept. 19 | 20.61 Sept. 12 |
| 1938 | 23.25 June 21 | 1961 July 6 |
| 1937 | 23.25 Mar. 9 | 20.25 Feb. 16 |
| 1936 | 19.74 Nov. 24 | 18.73 Aug. 11 |
| 1935 | 18.84 Nov. 5 | 17.83 May 14 |
| 1934 | 17.90 May 1 | 16.90 Jan. 27 |
| 1933 | 16.90 Dec. 5 | 13.56 Jan. 3 |
| 1932 | 14.81 Jan. 5 | 13.56 Dec. 6 |
| 1931 | 15.90 Jan. 6 | 14.79 Dec. 15 |
| 1930 | 18.21 Jan. 7 | 15.90 Dec. 16 |
| 1929 | 18.71 May 14 | 18.21 Dec. 17 |

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

| | HIGH | LOW |
|---|---|---|
| 1948 | $43.16 July 27 | $39.75 Mar. 9 |
| 1947 | 42.58 Oct. 28 | 29.50 May 20 |
| 1946 | 31.17 Dec. 24 | 19.17 Jan. 1 |
| 1945 | 19.17 Jan. 2 | 18.92 May 22 |
| 1944 | 19.17 Jan. 11 | 15.76 Oct. 24 |
| 1943 | $19.17 | $19.17 |
| 1942 | 19.17 | 19.17 |
| 1941 | $22.00 Jan. 7 | $19.17 Apr. 10 |
| 1940 | 21.83 Dec. 30 | 16.04 Apr. 9 |
| 1939 | 22.50 Oct. 3 | 14.08 May 16 |
| 1938 | 15.00 Nov. 22 | 11.00 June 7 |
| 1937 | 21.92 Mar. 30 | 12.67 June 9 |
| 1936 | 17.75 Dec. 21 | 12.67 June 8 |
| 1935 | 13.42 Dec. 10 | 10.33 Apr. 29 |
| 1934 | 13.00 Mar. 13 | 9.50 Sept. 25 |
| 1933 | 12.25 Aug. 8 | 6.75 Jan. 3 |
| 1932 | 8.50 Jan. 12 | 6.43 July 5 |
| 1931 | 11.33 Jan. 6 | 8.50 Dec. 29 |
| 1930 | 15.00 Feb. 18 | 11.25 Dec. 9 |
| 1929 | 17.58 Jan. 29 | 14.08 Dec. 8 |

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

# Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot. in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

| PRODUCTS | Base prices at producing points apply to the sizes and grades produced in these areas | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pittsburgh | Chicago | Gary | Cleveland | Birmingham | Buffalo | Youngstown | Sparrows Point | Granite City | Middletown, Ohio | | Detroit | Johnstown | Seattle, S. Fr'isco, LosAngeles | Fontana |
| **INGOTS** Carbon forging | $50.00 | | | | | | | | | | | | | | |
| Alloy | $51.00 | | | | | | (per net ton) | | | | | | | | |
| **BILLETS, BLOOMS, SLABS** Carbon, rerolling[12] | $52.00 | | | | $52.00 | $52.00 | (per net ton) | | | | | | $52.00 | | |
| Carbon forging billets | $61.00 | $61.00 | $61.00 | $61.00 | $61.00 | $61.00 | (per net ton) | | | | | | $61.00 | | |
| Alloy | $63.00 | $63.00 | | | | $63.00 | (Bethlehem, Canton, Massillon = $63.00) (per net ton) | | | | | | | | |
| **PIPE SKELP** | 3.25 | | | | | | 3.25 | | | | Warren =3.25 | | | | |
| **WIRE RODS** | 3.40 to 4.15 | 3.40 to 3.90 | | 3.40 | 3.40 | | 3.65 | 3.40 | | | Worcester 3.70 | | 3.40 | 4.05[13] 4.10[14] | |
| **SHEETS** Hot-rolled[6] | 3.25 to 3.30 | 3.25 | 3.25 | 3.25–3.30 | 3.25 | 3.25 | 3.25 | 3.25 | | Warren, Ashland =3.25 | | 3.45 | | 3.95[15] | 5.65 |
| Cold-rolled[1] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.20 | 4.00 | Warren 4.00 | 4.20 | | | |
| Galvanized (10 gage) | 4.40 | 4.40 | 4.40 | | 4.40 | | | 4.40 | Canton =4.40 | 4.40 | Ashland =4.40 | | | 5.15[15] | |
| Enameling (12 gage) | 4.40 | 4.40 | 4.40 | 4.40 | | | 4.40 | | 4.60 | 4.40 | | 4.70 | | | |
| Long ternes[2] (10 gage) | 4.80 | | 4.80 | | | | | | | 4.80 | | | | | |
| **STRIP** Hot-rolled[3] | 3.25 to 3.30 | 3.25 to 3.30 | 3.25 | 3.25 to 3.30 | 3.25 | 3.25 | 3.25 | 3.25 | | 3.25 | Warren =3.25 | 3.45 | | 4.00 to 4.25 | 5.90 |
| Cold-rolled[4] | 4.00 | 4.25 | | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | | New Haven 4.00 Warren =4.00 to 4.25 | | 4.20 to 4.50 | | | 7.10 |
| **TINPLATE** Cokes, 1 50 lb.[5] base box | 6.80 | 6.80 | 6.80 | | 6.90 | | | 6.90 | 7.00 | Warren, Ohio =6.80 | | | | Pittsburg, Cal.=7.55 | |
| Electrolytic 0.25, 0.50, 0.75 lb. box | Deduct $1.00. 80¢ and 60¢ respectively from 1.50 lb. coke base box price | | | | | | | | | | | | | | |
| **TERNES MFG.,** special coated | Deduct 90¢ from 1.50 lb. coke base box price | | | | | | | | | | | | | | |
| **BLACKPLATE CANMAKING** 55-70 lb, 75 95 lb, 100-128 lb | Deduct $1.60, $1.70 and $1.80 respectively from 1.50 lb. coke base box price | | | | | | | | | | | | | | |
| **BLACKPLATE,** h.e., 29 ga.[10] | 4.75 | 4.75 | 4.75 | | | | | 4.85 | | | | | | | |
| **BARS** Carbon Steel | 3.35 to 3.55 | 3.35 | 3.35 | 3.35 | 3.35 | 3.35 | 3.35 | 3.35 | | 3.35 | Canton =3.35 | | 3.35 | 4.05 to 4.10 | 5.30 |
| Reinforcing (billet)[7] | 3.35 | 3.35 | 3.35 | 3.35 | 3.35 | 3.35 | 3.35 | 3.35 | | | Canton =3.35 | | 3.35 | 4.05 to 4.10 | 5.30 |
| Cold-finished[8] | 3.95 to 4.00 | 4.00 | 4.00 | 4.00 | | | 4.00 | | | | | 4.30 | | | |
| Alloy, hot-rolled | 3.75 | 3.75 | 3.75 | | | 3.75 | 3.75 | Bethlehem, Canton, Massillon=3.75 | | | | | 3.75 | 4.80[14] | 5.60 |
| Alloy cold-drawn | | | | | | | | Massillon=4.65 | | | | | | | |
| **PLATE** Carbon steel[11] | 3.40 to 3.60 | 3.40 | 3.40 | 3.40 | 3.40 Conshohocken | 3.45 | 3.40 =3.95 | Coatesville=3.75, Claymont=3.95 Geneva, Utah=3.40, Harrisburg=5.85 | | | | 3.65 | 3.45 | 4.30[16] | 5.60 |
| Floor plates | 4.55 | 4.55 | | 4.55 | | | | Conshohocken =4.55 | | | | | | | |
| Alloy | 4.40 | 4.40 | | | | | | | Coatesville=5.10 | | | | | | |
| **SHAPES,** Structural | 3.25 | 3.25 | 3.25 | | 3.25 | 3.30 | Bethlehem=3.30, Geneva, Utah=3.25 | | | | | | 3.30 | 3.85 to 4.30 | 5.75 |
| **MANUFACTURERS' WIRE**[9] Bright | 4.15 to 4.50 | 4.15 to 4.65 | | 4.15 | 4.15 | | 4.15 | 4.25 | Duluth=4.15, Worcester=4.45 | | | | 4.15 | 5.10[13] | |
| Spring (high carbon) | 5.20 | 5.20 | | 5.20 | | | | 5.30 | Worcester=5.50 New Haven, Trenton=5.50 | | | | 5.20 | Duluth= 5.20-6.15 | |
| **PILING,** Steel sheet | 4.05 | 4.05 | | | | 4.05 | | | | | | | | | |

## STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

| Product | Chromium Nickel | | Straight Chromium | | | |
|---|---|---|---|---|---|---|
| | No. 302 | No. 304 | No. 410 | No. 430 | No. 442 | No. 446 |
| Billets, forging | 26.50 | 27.75 | 21.50 | 21.75 | 25.00 | 30.25–30.75 |
| Bars, hot-rolled | 28.50 | 30.00 | 23.00 | 23.50 | 27.00 | 32.50–33.00 |
| Bars, cold-finished | 28.50 | 30.00 | 23.00 | 23.50 | 27.00 | 32.50–33.00 |
| Plates | 32.00 | 34.00 | 26.00 | 26.50 | 31.00 | 35.50–39.00 |
| Shapes, structural | 28.50 | 30.00 | 23.00 | 23.50 | 27.00 | 32.50–33.00 |
| Sheets | 37.50 | 39.50 | 33.00 | 35.50 | 39.50 | 50.00 |
| Strip, hot-rolled | 25.75 | 27.75 | 21.25 | 21.75 | 28.50 | 45.00 |
| Strip, cold-rolled | 33.00 | 35.00 | 27.00 | 27.50 | 39.00 | 60.00 |
| Wire, cold-drawn | 28.50 | 30.00 | 23.00 | 23.50 | 27.00 | 32.50–33.00 |

## ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

| Diameter in in. | Length in in. | |
|---|---|---|
| **Graphite** | | |
| 17, 18, 20 | 60, 72 | 16.00¢ |
| 8 to 16 | 48, 60, 72 | 16.50¢ |
| 7 | 48, 60 | 17.75¢ |
| 6 | 48, 60 | 19.00¢ |
| 4, 5 | 40 | 19.50¢ |
| 3 | 40 | 20.50¢ |
| 2½ | 24, 30 | 21.00¢ |
| 2 | 24, 30 | 23.00¢ |
| **Carbon** | | |
| 40 | 100, 110 | 7.50¢ |
| 35 | 65, 110 | 7.50¢ |
| 30 | 65, 84, 110 | 7.50¢ |
| 24 | 72 to 104 | 7.50¢ |
| 17 to 20 | 84, 90 | 7.50¢ |
| 14 | 60, 72 | 8.00¢ |
| 10, 12 | 60 | 8.25¢ |
| 8 | 60 | 8.50¢ |

## TOOL STEEL

*F.o.b. mill*

| W | Cr | V | Mo | Co | Base per lb |
|---|---|---|---|---|---|
| 18 | 4 | 1 | — | — | 90.5¢ |
| 18 | 4 | 1 | — | 5 | $1.42 |
| 18 | 4 | 2 | — | — | $1.025 |
| 1.5 | 4 | 1.5 | 8 | — | 65¢ |
| 6 | 4 | 2 | 6 | — | 69.5¢ |

High-carbon-chromium ..... 52¢
Oil harden manganese ..... 29¢
Special carbon ..... 26.5¢
Extra carbon ..... 22¢
Regular carbon ..... 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

## ELECTRICAL SHEETS

*Base, HR cut lengths, f.o.b. mill*

| | *Cents per lb* |
|---|---|
| Armature | 5.45 |
| Electrical | 5.95 |
| Motor | 6.70 |
| Dynamo | 7.50 |
| Transformer 72 | 8.05 |
| Transformer 65 | 8.60 |
| Transformer 58 | 9.30 |
| Transformer 52 | 10.10 |

## RAILS, TRACK SUPPLIES

*F.o.b. mill*

Standard rails, 100 lb and heavier, No. 1 O.H., per 100 lb ..... $3.20
Joint bars, 100 lb ..... 4.25
Light rails (from billets) per 100 lb ..... 3.55

| | *Base per lb* |
|---|---|
| Cut spikes | 5.35¢ |
| Screw spikes | 8.00¢ |
| Tie plates | 4.05¢ |
| Tie plates, Pittsburgh, Calif.* | 4.20¢ |
| Track bolts | 7.50¢ |
| Track bolts, heat treated, to railroads | 8.50¢ |

*Seattle, add 30¢.

## C-R SPRING STEEL

*Base per pound f.o.b. mill*

0.26 to 0.40 carbon ..... 4.00¢
0.41 to 0.60 carbon ..... 5.50¢
0.61 to 0.80 carbon ..... 6.10¢
0.81 to 1.05 carbon ..... 8.05¢
1.06 to 1.35 carbon ..... 10.35¢
Worcester, add 0.30¢.

## CLAD STEEL

*Base prices, cents per pound*

| Stainless clad | Plate | Sheet |
|---|---|---|
| No. 304, 20 pct, f.o.b. | | |
| Coatesville, Pa. | *27.00 | |
| Washington, Pa. | *26.50 | *22.50 |
| Claymont, Del. | *26.50 | |
| Conshohocken, Pa. | | *22.50 |
| Nickel-clad | | |
| 10 pct f.o.b. Coatesville, Pa. | 27.50 | |
| Inconel-clad | | |
| 10 pct, f.o.b. Coatesville. | 36.00 | |
| Monel-clad | | |
| 10 pct, f.o.b. Coatesville. | 29.00 | |
| Alumnized steel sheets | | |
| Hot dip, 20 gage, f.o.b. Butler, Pa. | .... | 9.25 |

* Includes annealing and pickling, or sandblasting.

## MERCHANT WIRE PRODUCTS

*To the dealer, f.o.b. mill*

| | *Base Column* | *Pittsburgh, Calif.* |
|---|---|---|
| Standard & coated nails* | 103 | 123 |
| Galvanized nails* | 103 | 123 |
| Woven wire fence† | 109 | 132 |
| Fence posts, carloads†† | 114 | ... |
| Single loop bale ties | 106 | 130 |
| Galvanized barbed wire** | 123 | 143 |
| Twisted barbless wire | 123 | ... |

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

| | *Base per 100 lb* | *Pittsburg, Calif.* |
|---|---|---|
| Annealed fence wire‡ | $4.80 | $5.75 |
| Annealed, galv. fencing‡ | 5.25 | 6.20 |
| Cut nails, carloads‡‡ | 6.75 | .... |

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

## HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

| Steel | Aldecor | Corten | Double Strength No. 1 | Dynalloy | HI Steel | Mayari R | Otiscoloy | Yoloy | NAX High Tensile |
|---|---|---|---|---|---|---|---|---|---|
| Producer | Republic | Carnegie-Illinois, Republic | Republic | Alan Wood | Inland | Bethlehem | Jones & Laughlin | Youngstown Sheet & Tube | Great Lakes Steel |
| Plates | 5.20 | 5.20 | 5.20 | 5.30 | 5.20 | 5.30 | 5.20 | 5.20 | 5.65 |
| Sheets | | | | | | | | | |
| Hot-rolled | 4.95 | 4.95 | 4.95 | 5.25 | 4.95 | 4.95 | 4.95 | 4.95 | 5.25 |
| Cold-rolled | 6.05 | 6.05 | 6.05 | .... | 6.05 | 6.05 | 6.05 | 6.05 | 6.35 |
| Galvanized | .... | 6.75 | .... | .... | .... | 6.75 | .... | .... | .... |
| Strip | | | | | | | | | |
| Hot-rolled | 4.95 | 4.95 | 4.95 | .... | 4.95 | 4.95 | 4.95 | 4.95 | 5.25 |
| Cold-rolled | .... | .... | 6.05 | .... | .... | 6.05 | 6.05 | .... | 6.35 |
| Shapes | .... | 4.95 | .... | .... | 4.95 | 5.05 | 4.95 | .... | .... |
| Beams | .... | 4.95 | .... | .... | .... | .... | .... | .... | .... |
| Bars | | | | | | | | | |
| Hot-rolled | 5.10 | 5.10 | 5.10 | .... | 5.10 | 5.10 | 5.10 | .... | 5.40 |
| Bar shapes | .... | 5.10 | .... | .... | 5.10 | 5.10 | 5.10 | .... | .... |

† Pittsburgh, add 0.10c at Chicago and Gary.

## PIPE AND TUBING

*Base discounts, f.o.b. mills, steel buttweld and seamless. Base price, $200.00 per net ton.*

### *Standard, threaded and coupled*

| Steel, buttweld* | Black | Galv. |
|---|---|---|
| ¾-in. | 46 | 26½ |
| 1-in. | 48½ | 29½ |
| 1¼-in. | 49 | 30 |
| 1½-in. | 49½ | 30½ |
| 2-in. | 50 | 31 |
| 2½ and 3-in. | 50½ | 31½ |
| **Wrought Iron, buttweld** | | |
| ⅛-in. | +20½ | +50 |
| ¼-in. | +10½ | +39 |
| ⅜ and 1¼-in. | + 4½ | +30 |
| 2-in. | — 1½ | +26½ |
| 2-in. | — 2 | +26 |
| **Steel, lapweld** | | |
| 2-in. | 39½ | 20 |
| 2½ and 3-in. | 43½ | 24 |
| 3½ to 6-in. | 45½ | 26 |
| **Steel, seamless** | | |
| 2-in. | 38½ | 19 |
| 2½ and 3-in. | 41½ | 22 |
| 3½ to 6-in. | 43½ | 24 |
| **Wrought Iron, lapweld** | | |
| 2-in. | + 7½ | +34 |
| 2½ to 3½-in. | + 5 | +29½ |
| 4-in. | list | +23½ |
| 4½ to 8-in. | + 2 | +25 |

### *Extra Strong, plain ends*

| Steel, buttweld | | |
|---|---|---|
| ½-in. | 41 | 22 |
| ¾-in. | 45 | 26 |
| 1-in. | 47 | 29 |
| 1¼-in. | 47½ | 29½ |
| 1½-in. | 48 | 30 |
| 2-in. | 48½ | 30½ |
| 2½ and 3-in. | 49 | 31 |
| **Wrought Iron, buttweld** | | |
| ½-in. | +16 | +44 |
| ¾-in. | + 9½ | +37 |
| 1 to 2-in. | — 1½ | +26 |
| **Steel, lapweld** | | |
| 2-in. | 38½ | 20 |
| 2½ and 3-in. | 43½ | 25 |
| 3½ to 6-in. | 45½ | 26 |
| **Steel, seamless** | | |
| 2-in. | 37½ | 19 |
| 2½ and 3-in. | 41½ | 23 |
| 3½ and 6-in. | 45 | 26½ |
| **Wrought Iron, lapweld** | | |
| 2-in. | + 4½ | +30½ |
| 2½ to 4-in. | — 5 | +19 |
| 4½ to 6-in. | — 1 | +23½ |

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

*F.o.b. Fontana prices average 17 points lower discount (higher price) on black, 14 points on galvanized.

## BOILER TUBES

*Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.*

| OD in. | Gage BWG | Seamless H.R. | Seamless C.R. | Electric Weld H.R. | Electric Weld C.D. |
|---|---|---|---|---|---|
| 2 | 13 | 19.18 | 22.56 | 18.60 | 21.89 |
| 2½ | 12 | 25.79 | 30.33 | 25.02 | 29.41 |
| 3 | 12 | 28.68 | 33.76 | 27.82 | 32.74 |
| 3½ | 11 | 35.85 | 42.20 | 34.78 | 40.94 |
| 4 | 10 | 44.51 | 52.35 | 43.17 | 50.78 |

## CAST IRON WATER PIPE

*Per net ton*

| | |
|---|---|
| 6 to 24-in., del'd Chicago | $106.70 |
| 6 to 24-in., del'd N. Y. | 103.50 to 108.40 |
| 6 to 24-in., Birmingham | 93.50 |
| 6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less | 120.30 |

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

## BOLTS, NUTS, RIVETS, SET SCREWS

***Consumer Prices***

*(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)*

*Base discount less case lots*

### *Machine and Carriage Bolts*

| | Pct Off List |
|---|---|
| ½ in. & smaller x 6 in. & shorter | 35 |
| 9/16 & ⅝ in. x 6 in. & shorter | 37 |
| ¾ in. & larger x 6 in. & shorter | 34 |
| All diam, longer than 6 in. | 30 |
| Lag, all diam over 6 in. longer | 35 |
| Lag, all diam x 6 in. & shorter | 37 |
| Plow bolts | 47 |

### *Nuts, Cold Punched or Hot Pressed*

*(Hexagon or Square)*

| | |
|---|---|
| ½ in. and smaller | 35 |
| 9/16 to 1 in. inclusive | 34 |
| 1⅛ to 1½ in. inclusive | 32 |
| 1⅝ in. and larger | 27 |

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

### *Semifin. Hexagon Nuts*

| | USS | SAE |
|---|---|---|
| 7/16 in. and smaller | .. | 41 |
| ½ in. and smaller | 38 | .. |
| ½ in. through 1 in. | .. | 39 |
| 9/16 in. through 1 in. | 37 | .. |
| 1⅛ in. through 1½ in. | 35 | 37 |
| 1⅝ in. and larger | 28 | .. |

In full case lots, 15 pct additional discount.

### *Stove Bolts*

| | |
|---|---|
| Packages, nuts separate | $61.75 |
| In bulk | 70.00 |

### *Large Rivets*

*(½ in. and larger)*

| | Base per 100 lb |
|---|---|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | $6.75 |
| F.o.b. Lebanon, Pa. | 6.75 |

### *Small Rivets*

*(7/16 in. and smaller)*

| | Pct Off List |
|---|---|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | 48 |

### *Cap and Set Screws*

| *(In packages)* | Pct Off List |
|---|---|
| Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright | 46 |
| ¾ to 1 in. x 6 in., SAE (1035), heat treated | 35 |
| Set screws, oval points | |
| Milled studs | 19 |
| Flat head cap screws, listed sizes | 5 |
| Fillister head cap, listed sizes | 28 |

## FLUORSPAR

Metallurgical grade, f.o.b. uroducing plant.

| Effective CaF, Content: | Base price per short ton |
|---|---|
| 70% or more | $35.00 |
| 65% but less than 70% | 34.00 |
| 60% but less than 65% | 33.00 |
| Less than 60% | 32.00 |

## LAKE SUPERIOR ORES

*(51.50% Fe, Natural Content, Delivered Lower Lake Ports)*

| | Per Gross Ton |
|---|---|
| Old range, bessemer | $6.60 |
| Old range, nonbessemer | 6.45 |
| Mesabi, bessemer | 6.35 |
| Mesabi, nonbessemer | 6.20 |
| High phosphorus | 6.20 |

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

## METAL POWDER

*Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.*

| | |
|---|---|
| Swedish sponge iron c.i.f. New York, ocean bags | 7.9¢ to 9.0¢ |
| Domestic sponge iron, 98+% Fe | 9.5¢ to 16.0¢ |
| Electrolytic iron, annealed, 99.5+% Fe | 19.5¢ to 39.5¢ |
| Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe | 44.0¢ |
| Hydrogen reduced iron, minus 300 mesh, 98+% Fe | 63.0¢ to 80.0¢ |
| Carbonyl iron, minus 300 mesh, 98%, 99.8+% Fe | 90.0¢ to $1.75 |
| Aluminum | 24.00¢ |
| Antimony | 47.67¢ |
| Brass | 27.25 to 37.25¢ |
| Copper, electrolytic | 33.625¢ |
| Copper, reduced | 33.75¢ |
| Cadmium | $2.55 |
| Chromium, electrolytic, 99% min. | $3.50 |
| Lead | 26.00¢ |
| Manganese | 50.0¢ |
| Molybdenum, 99% | $2.65 |
| Nickel, unannealed | 67.00¢ |
| Nickel, spherical, minus 30 mesh, unannealed | 61.00¢ |
| Silicon | 29.0¢ |
| Solder powder | 8.5¢ plus metal cost |
| Stainless steel, 302 | 75.0¢ |
| Tin | $1.15 |
| Tungsten, 95%, 99% | $2.90 |

## COKE

| | Net Ton |
|---|---|
| Furnace, beehive (f.o.b. oven) Connellsville, Pa. | $14.50 to $15.50 |
| Foundry, beehive (f.o.b. oven) Connellsville, Pa. | $16.00 to $18.00 |
| Foundry, Byproduct | |
| Chicago, del'd | $23.90 |
| Chicago, f.o.b. | 20.85 |
| Detroit, f.o.b. | 19.40 |
| New England, del'd | 22.75 |
| Seaboard, N. J., f.o.b. | 21.50 |
| Philadelphia, f.o.b. | 20.55 |
| Swedeland, Pa., f.o.b. | 20.50 |
| Painesville, Ohio, f.o.b. | 20.90 |
| Erie, del'd | 19.95 |
| Cleveland, del'd | 22.45 |
| Cincinnati, del'd | 21.40 |
| St. Louis, del'd | 20.98 |
| Birmingham, del'd | 17.86 |

## REFRACTORIES

*(F.o.b. Works)*

| *Fire Clay Brick* | Carloads, Per 1000 |
|---|---|
| First quality, Pa., Md., Ky., Mo. except Salina, Pa., add $5) | $80.00 |
| No. 1 Ohio | 74.00 |
| Sec. quality, Pa., Md., Ky., Mo. | 74.00 |
| No. 2 Ohio | 66.00 |
| Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) | 11.50 |
| ***Silica Brick*** | |
| Mt. Union, Pa., Ensley, Ala. | $80.00 |
| Childs, Pa. | 84.00 |
| Hays, Pa. | 85.00 |
| Chicago District | 89.00 |
| Western, Utah and Calif. | 95.00 |
| Super Duty, Hays, Pa., Athens, Tex. | 85.00 |
| Silica cement, net ton, bulk, Eastern (except Hays, Pa.) | $13.75 to 14.00 |
| Silica cement, net ton, bulk, Hays, Pa. | 16.00 |
| Silica cement, net ton, bulk, Ensley, Ala. | 15.00 |
| Silica cement, net ton, bulk, Chicago District | 14.75 |
| Silica cement, net ton, bulk, Utah and Calif. | 21.00 |
| ***Chrome Brick*** | Per Net Ton |
| Standard chemically bonded, Balt., Chester | $69.00 |
| ***Magnesite Brick*** | |
| Standard, Balt. and Chester | $91.00 |
| Chemically bonded, Balt. and Chester | 80.00 |
| ***Grain Magnesite*** | *Std. ⅜-in. grains* |
| Domestic, f.o.b. Balt. and Chester, in bulk, fines removed | $56.50 |
| Domestic, f.o.b. Chewelah, Wash., in bulk with fines | $30.50 to 31.00 |
| in sacks with fines | 35.00 to 35.50 |
| ***Dead Burned Dolomite*** | |
| F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢ | $11.85 |

## WAREHOUSE PRICES

*Base prices, f.o.b. warehouse, per 100 lb.*
*(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)*

| CITIES | SHEETS | | | STRIP | | PLATES | SHAPES | BARS | | ALLOY BARS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot-Rolled (18 ga. up) | Cold-Rolled (15 gage) | Galvanized (10 gage) | Hot-Rolled | Cold-Rolled | | Standard Structural | Hot-Rolled | Cold-Finished | Hot-Rolled, A 4615 As-rolled | Hot-Rolled, A 4140-50 Ann. | Cold-Drawn, A 4615 As-rolled | Cold-Drawn, A 4140-50 Ann. |
| Philadelphia | $5.15-5.71 | $6.31-6.57 | $7.27-7.47 | $5.35-5.66 | $6.51 | $5.37-5.50 | $5.09-5.20 | $5.35-5.50 | $6.16-6.26 | $9.14 | $9.29 | $10.54 | $10.69 |
| New York | 5.40-5.98 | 6.28-6.43 | 7.25-7.73 | 5.58-5.88 | 6.48-6.73 | 5.78 | 5.32-5.58 | 5.53-5.63 | 6.18-6.38 | 9.17-9.53 | 9.32-9.68 | 10.40-10.77 | 10.55-10.92 |
| Boston | 5.48-5.64 | 6.39 | 7.56-7.69 | 5.54-5.89 | 6.75-6.79 | 5.74 | 5.39-5.54 | 5.48-5.59 | 6.24-6.34 | 9.40-9.44 | 9.55-9.59 | 10.84-10.94 | 10.92-11.09 |
| Baltimore | 5.28 | 6.18 | 7.15-7.38 | 5.34 | .... | 5.53 | 5.33-5.39 | 5.39 | 6.13 | .... | .... | .... | .... |
| Chicago | 4.85-5.10 | 5.75-5.95 | 6.95-7.05 | 4.85-5.30 | 6.15 | 5.10 | 4.90 | 4.90 | 5.70 | 9.00 | 9.15 | 10.40 | 10.55 |
| Milwaukee | 5.02-5.07 | 5.92 | 7.12-7.22 | 5.02-5.37 | 6.32 | 5.22-5.27 | 5.07 | 5.07 | 5.87 | 9.15-9.17 | 9.32 | 10.52-10.57 | 10.67-10.72 |
| Norfolk | 5.75 | .... | .... | .... | .... | 6.00 | 6.00 | 6.00 | .... | .... | .... | .... | .... |
| Cleveland | 4.98-5.20 | 5.75[1]-6.04[1] | 7.18-7.24 | 5.02-5.65 | 6.70 | 5.35-5.54 | 5.16-5.42 | 5.15-5.34 | 5.70-5.95 | 9.14-9.29 | 9.29-9.79 | 10.54 | 10.69 |
| Buffalo | 4.85-5.10 | 5.75-5.85 | 7.55-7.70 | 5.55-5.56 | 6.35 | 5.45-5.48 | 5.10 | 5.15-5.20 | 5.90-6.05 | 9.05-9.35 | 9.40-9.50 | 10.75 | 20.90 |
| Detroit | 5.20-5.55 | 6.05-6.50 | 7.45 | 5.25-5.70 | 6.25-6.55 | 5.50-5.55 | 5.30-5.37 | 5.30-5.52 | 6.02-6.07 | 9.31-9.55 | 9.20-9.47 | 10.72-10.95 | 10.87-11.10 |
| Cincinnati | 5.14-5.36[3] | 5.82-6.21[3] | 6.97-7.45 | 5.25-5.62[3] | 6.31 | 5.50-5.71[3] | 5.30-5.47[3] | 5.30-5.62[3] | 6.06-6.17[3] | 9.31-9.35 | 9.50-9.51 | 10.75-10.76 | 10.90-10.91 |
| St. Louis | 5.19 | 6.04-6.09 | 7.29-7.39 | 5.19-5.79 | 6.49 | 5.39-5.44 | 5.24 | 5.24 | 6.04 | 9.34 | 9.49 | 10.74 | 10.89 |
| Pittsburgh | 4.85-4.90 | 5.75[1] | 6.95-7.05 | 5.00-5.35 | 5.95 | 5.05-5.25 | 4.90-5.15 | 4.90-5.10 | 5.65-5.80 | 9.00 | 9.15 | 10.40 | 10.55-10.80 |
| St. Paul | 5.41 | 6.31 | 7.30-7.61 | 5.41 | .... | 5.66 | 5.46 | 5.46 | 6.26 | 9.56 | 9.71 | 10.96 | 11.11 |
| Omaha | 5.92 | .... | 9.18 | 5.92 | .... | 6.17 | 5.97 | 5.97 | 6.77 | .... | .... | .... | .... |
| Birmingham | 5.05[1] | 6.36 | 6.45 | 5.05[11] | 6.36 | 5.25[11] | 5.00[11] | 5.00[11] | 6.51 | .... | .... | .... | .... |
| Houston | 6.40 | .... | 8.80 | 6.75 | .... | 6.35 | 6.20 | 6.40 | 7.60 | 9.80 | 9.65 | 10.75 | 10.95 |
| Los Angeles | 6.30-6.40 | 7.85[1]-7.90 | 7.95-8.55 | 6.60-6.66 | 9.35[5] | 5.95-6.10 | 5.75-5.90 | 6.05 | 7.85[15]-7.95 | 10.35[15] | 10.20[15] | 11.75[15] | 11.95[15] |
| San Francisco | 5.95[3] | 7.15[2] | 7.85-8.05[2] | 6.408-6.758 | 8.25 | 6.308-7.608 | 5.90 | 5.90 | 7.55 | 10.35[15] | 10.20[15] | 11.75[15] | 11.95[15] |
| Portland | 6.50[4] | 8.00[2] | 8.15[2]-8.45[2] | 6.85[4] | .... | 6.30[4] | 6.25[4] | 6.25[4] | 8.25[4] | .... | 10.45[15] | .... | 12.05[15] |
| Seattle | 6.20[4]-8.30[4] | 7.75[2]-7.85[2] | 7.65-8.00 | 6.55[4]-6.85[4] | .... | 6.20-6.30 | 6.15-6.25 | 6.05[4]-6.15[4] | 8.00[14]-8.10[14] | .... | 10.30[15]-10.40[15] | .... | 12.00[15]-12.05[15] |
| Salt Lake City | 6.15-8.00 | 7.35 | 7.90-9.06 | 7.10-7.45 | .... | 5.75-6.65 | 6.65-7.00 | 6.95-7.25 | 7.55-8.40 | .... | .... | .... | .... |

## BASE QUANTITIES

*Standard unless otherwise keyed on prices.*

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 800 to 4999 lb; (4) 800 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

## PIG IRON PRICES

*Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.*

### PRODUCING POINT PRICES

| Producing Point | Basic | No. 2 Foundry | Malleable | Bessemer | Low Phos. |
|---|---|---|---|---|---|
| Bethlehem | 48.00 | ..... | ..... | ..... | ..... |
| Birmingham | 42.88 | 43.38 | ..... | ..... | ..... |
| Buffalo | 44.00-48.00* | 44.00-48.00* | 44.50-48.50* | ..... | ..... |
| Chicago | 43.00 | 43.00 | 43.50 | 44.00 | ..... |
| Cleveland | 43.00 | 43.50 | 43.50 | 44.00 | 48.00 |
| Duluth | 43.00 | 43.50 | 44.00 | 44.50 | ..... |
| Erie | 42.50 | 43.00 | 43.50 | 44.00 | ..... |
| Everett | ..... | 48.75 | 49.25 | ..... | ..... |
| Granite City | 47.90 | 48.40 | 48.90 | ..... | ..... |
| Neville Island | 46.00 | 46.50 | 46.50 | ..... | ..... |
| Provo | 43.00 | 43.50 | ..... | ..... | ..... |
| Sharpsville | 43.00 | 43.50 | 43.50 | 44.00 | ..... |
| Steelton | 48.00 | 48.50 | 49.00 | 49.50 | 54.00 |
| Struthers, Ohio | 43.00 | ..... | ..... | ..... | ..... |
| Swedeland | 50.00 | 50.50 | 51.00 | 51.50 | ..... |
| Toledo | 42.50 | 43.00 | 43.50 | 44.00 | ..... |
| Troy, N. Y. | ..... | ..... | ..... | ..... | 50.00 |
| Youngstown | 43.00 | 43.50 | 43.50 | 44.00 | ..... |

### DELIVERED PRICES† (BASE GRADES)

| Consuming Point | Producing Point | Freight Rate | Basic | No. 2 Foundry | Malleable | Bessemer | Low Phos. |
|---|---|---|---|---|---|---|---|
| Boston | Everett | $0.50 Arb. | ..... | 48.75 | 49.25 | ..... | ..... |
| Boston | Steelton | 6.27 | 50.27 | 50.77 | 51.27 | 51.77 | 56.27 |
| Brooklyn | Bethlehem | 3.90 | 51.90 | ..... | ..... | ..... | ..... |
| Cincinnati | Birmingham | 6.09 | 48.97 | 49.47 | ..... | ..... | ..... |
| Jersey City | Bethlehem | 2.39 | 50.39 | ..... | ..... | ..... | ..... |
| Los Angeles | Provo | 6.93 | 49.93 | 50.43 | ..... | ..... | ..... |
| Mansfield | Cleveland-Toledo | 3.03 | 45.53-46.03 | 46.03-46.53 | 46.53 | 47.03 | ..... |
| Philadelphia | Bethlehem | 2.21 | 50.21 | ..... | ..... | ..... | ..... |
| Philadelphia | Swedeland | 1.31 | 51.31 | 51.81 | 52.31 | 52.81 | ..... |
| Philadelphia | Steelton | 2.81 | 50.81 | 51.31 | 51.81 | 52.31 | 56.81 |
| San Francisco | Provo | 6.93 | 49.93 | 50.43 | ..... | ..... | ..... |
| Seattle | Provo | 6.93 | 49.93 | 50.43 | ..... | ..... | ..... |
| St. Louis | Granite City | 0.75 Arb. | 48.65 | 49.15 | 49.65 | ..... | ..... |

* Republic Steel Corp. price: Basis: pig iron at Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Buffalo as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$56.50; f.o.b. Buffalo—$57.75. Add $1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $62.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $69.55. High phosphorus charcoal pig iron is not being produced.

### *Ferromanganese*

78-82% Mn, Maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Phila., New York.....$145
F.o.b. Birmingham .....$150
F.o.b. Niagara Falls, Alloy, W. Va., Weirland, Ont. .....$145
F.o.b. Johnstown, Pa. .....$147
F.o.b. Sheridan, Pa. .....$160
F.o.b. Rockwood, Tenn.....$165
F.o.b. Etna, Pa. .....$148
**$1.80 for each 1% above 82% Mn; penalty, $1.80 for each 1% below 78%.**

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload, bulk ... | 8.70 | 8.95 | 9.50 |
| Ton lots ..... | 10.30 | 10.90 | 12.80 |
| Less ton lots .... | 11.20 | 11.80 | 13.70 |

### *Spiegeleisen*

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

| | 16-19% Mn 3% max. Si | 19-21% Mn 3% max. Si |
|---|---|---|
| Carloads ..... | $61.00 | $62.00 |
| F.o.b. Pittsburgh . | 55.00 | 56.00 |

### *Manganese Metal*

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

| | |
|---|---|
| Carload, bulk ..... | 32 |
| L.c.l. lots ..... | 34 |

### *Electrolytic Manganese*

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

| | |
|---|---|
| Carloads ..... | 32 |
| Ton lots ..... | 34 |
| Less ton lots ..... | 36 |

### *Low-Carbon Ferromanganese*

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

| | Carloads | Ton | Less |
|---|---|---|---|
| 0.07% max. C. 0.06% P, 90% Mn ..... | 23.00 | 24.85 | 26.05 |
| 0.10% max. C ..... | 22.50 | 24.35 | 25.55 |
| 0.15% max. C ..... | 22.00 | 23.85 | 25.05 |
| 0.30% max. C ..... | 21.50 | 23.35 | 24.55 |
| 0.50% max. C ..... | 21.00 | 22.85 | 24.05 |
| 0.75% max. C, 7.00% max. Si .... | 18.00 | 19.85 | 21.05 |

### *Silicomanganese*

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

| | |
|---|---|
| Carload bulk ..... | 7.80 |
| Ton lots ..... | 9.45 |
| Briquet, contract, basis, carlots, bulk freight allowed, per lb of briquet | 8.75 |
| Ton lots ..... | 10.35 |
| Less ton lots ..... | 11.25 |

### *Silvery Iron (electric furnace)*

Si 14.01 to 14.50 pct., f.o.b. Keokuk, Iowa, openhearth $81.00, foundry, $82.00; $81.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50 pct Mn over 1 pct.

### *Silicon Metal*

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

| | Eastern | Central | Western |
|---|---|---|---|
| 96% Si, 2% Fe.. | 16.90 | 17.50 | 18.10 |
| 97% Si, 1% Fe.. | 17.30 | 17.90 | 18.50 |

### *Silicon Briquets*

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si, 1 lb Si briquets.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload, bulk ... | 5.25 | 5.50 | 5.70 |
| Ton lots ..... | 6.85 | 7.45 | 7.75 |
| Less ton lots ... | 7.75 | 8.35 | 8.65 |

### *Electric Ferrosilicon*

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

| | Eastern | Central | Western |
|---|---|---|---|
| 25% Si ..... | 17.50 | .... | .... |
| 50% Si ..... | 9.30 | 9.80 | 10.00 |
| 75% Si ..... | 11.80 | 12.10 | 12.85 |
| 85% Si ..... | 13.30 | 13.60 | 14.35 |
| 90% Si ..... | 15.00 | 15.30 | 16.00 |

### *Calcium Metal*

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

| | Cast | Turnings | Distilled |
|---|---|---|---|
| Ton lots .....$1.85 | $2.70 | $3.40 |
| Less ton lots .... | 2.20 | 3.05 | 4.20 |

### *Ferrochrome* (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

| | Eastern | Central | Western |
|---|---|---|---|
| 0.06% C ..... | 26.50 | 26.90 | 27.00 |
| 0.10% C ..... | 26.00 | 26.40 | 26.50 |
| 0.15% C ..... | 25.50 | 25.90 | 26.00 |
| 0.20% C ..... | 25.25 | 25.65 | 25.75 |
| 0.50% C ..... | 25.00 | 25.40 | 25.50 |
| 1.00% C ..... | 24.50 | 24.90 | 25.00 |
| 2.00% C ..... | 24.25 | 24.65 | 24.75 |
| 65-69% Cr, 4-9% C ..... | 18.60 | 19.00 | 19.15 |
| 62-66% Cr. 4-6% C. 6-9% Si ..... | 19.45 | 19.85 | 20.00 |

Briquets — Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload, bulk ... | 12.50 | 12.75 | 12.85 |
| Ton lots ..... | 14.00 | 14.90 | 15.50 |
| Less ton lots.... | 14.90 | 15.80 | 16.40 |

### *High-Nitrogen Ferrochrome*

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

### *S. M. Ferrochrome*

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload ..... | 19.70 | 20.10 | 20.25 |
| Ton lots ..... | 21.85 | 23.15 | 23.95 |
| Less ton lots .... | 23.35 | 24.65 | 25.45 |

Low carbon type: 62-66% Cr, 4-6% Si. 4-6% Mn, 1.25% max. C.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload ..... | 25.00 | 25.40 | 25.50 |
| Ton lots ..... | 27.30 | 27.95 | 29.15 |
| Less ton lots ... | 29.10 | 29.75 | 30.95 |

### *Chromium Metal*

Contract prices, cents per lb. chromium contained carload packed, f.o.b. shipping point freight allowed, 97% min. Cr. 1% max. Fe.

| | Eastern | Central | Western |
|---|---|---|---|
| 0.20% max. C.... | 97.00 | 98.50 | 99.75 |
| 0.50% max. C.... | 93.00 | 94.50 | 95.75 |
| 9.00% min. C.... | 91.50 | 93.00 | 94.25 |

### *Calcium—Silicon*

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe
Cr 28-32% Ca, 60-65% Si, 6.00% max. Fe.

| | Eastern | Central | Western |
|---|---|---|---|
| Carloads ..... | 16.25 | 16.75 | 18.80 |
| Ton lots ..... | 19.35 | 20.10 | 22.25 |
| Less ton lots .... | 20.85 | 21.60 | 23.75 |

### *Calcium—Manganese—Silicon*

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

| | Eastern | Central | Western |
|---|---|---|---|
| Carloads ..... | 17.50 | 18.00 | 20.05 |
| Ton lots ..... | 19.80 | 20.65 | 22.40 |
| Less ton lots .... | 20.80 | 21.65 | 23.40 |

### *CMSZ*

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

| | Eastern | Central | Western |
|---|---|---|---|
| Ton lots ..... | 18.00 | 19.10 | 21.05 |
| Less ton lots .... | 19.25 | 20.35 | 22.30 |

### *V Foundry Alloys*

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn. V-7: 28-32% Cr, 15-21% Si, 14-16% Mn.

| | |
|---|---|
| Ton lots ..... | 14.60¢ |
| Less ton lots ..... | 15.85¢ |

### *Graphidox No. 4*

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed Si 56%, Ti 9%, Ca 5%.

| | |
|---|---|
| Ton lots ..... | 17.90¢ |
| Less ton lots ..... | 19.40¢ |

### *SMZ*

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

| | Eastern | Central | Western |
|---|---|---|---|
| Ton lots ..... | 15.75 | 16.85 | 18.80 |
| Less ton lots .... | 17.00 | 18.10 | 20.05 |

### *Other Ferroalloys*

| | |
|---|---|
| Ferrotungsten, standard, lump or ¼ x down, packed f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained W, 5 ton lots, freight allowed... | $2.25 |
| Ferrovanadium, 35-55%, contract basis, f.o.b. plant freight allowances, per pound contained V. | |
| Openhearth ..... | $2.90 |
| Crucible ..... | 3.00 |
| High speed steel (Primos).... | 3.10 |
| Vanadium pentoxide, 88-92% $V_2O_5$ contract basis, per pound Contained $V_2O_5$ ..... | $1.20 |
| Ferrocolumbian, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb | |
| Ton lots ..... | $2.50 |
| Less ton lots ..... | $2.55 |
| Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. ..... | 95¢ |
| Calcium molybdate, 45-50%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. ..... | 80¢ |
| Molybdenum oxide briquets, 48- Langeloth and Washington, Pa., per pound contained Mo..... | 80¢ |
| Molybdenum oxide in bags, f.o.b. Langeloth and Washington, Pa., per pound contained Mo..... | 80¢ |
| Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti | $1.23 |
| Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti ..... | $1.35 |
| Less ton lots ..... | 1.40 |
| High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton.... | $152.50 |
| Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton ..... | $65.00 |
| 10 tons to less carload..... | 75.00 |
| Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy. | |
| Carload lots ..... | 18.40¢ |
| Zirconium, 12-15%, contract basis, lump, f.o.b. plant, frieght allowed, per pound of alloy. | |
| Carload, bulk ..... | 6.00¢ |
| Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y. | |
| Carload ..... | 7.95¢ |
| Ton lots ..... | 8.85¢ |
| Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound | |
| Car lots ..... | 10.50 |
| Ton lots ..... | 11.25 |

### *Boron Agents*

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

| | Eastern | Central | Western |
|---|---|---|---|
| Ton lot .... | $1.20 | $1.21 | $1.23 |

Manganese—Boron 75.00% Mn. 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

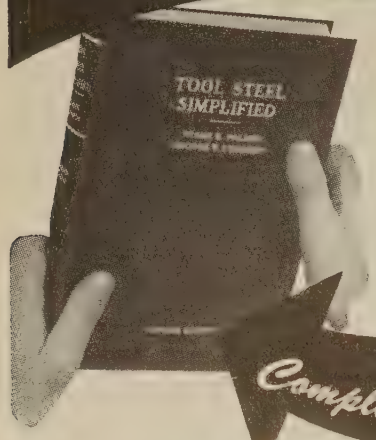
| | | | |
|---|---|---|---|
| Ton lots ..... | $1.89 | $1.903 | $1.935 |
| Less ton lots.. | 2.01 | 2.023 | 2.055 |

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

| | | | |
|---|---|---|---|
| Less ton lots ...$1.80 | $1.81 | $1.84 |

| | |
|---|---|
| Silcaz, contract basis, f.o.b. plant freight allowed, per pound. | |
| Carload lots ..... | 39.00¢ |
| Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over. | |
| No. 1 ..... | 93¢ |
| No. 6 ..... | 63¢ |
| No. 79 ..... | 45¢ |
| Bortam, f.o.b. Niagara Falls | |
| Ton lots, per pound ..... | 45¢ |
| Less ton lots, per pound .... | 50¢ |
| Carbortam, f.o.b. Suspension Bridge, N. Y., freight allowed. Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%. | |
| Ton lots, per pound..... | 8.625¢ |
| Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B ..... | $6.25 |

# It's here!




**TOOL STEEL SIMPLIFIED**
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564 Pages 355 Illustrations
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## PLAIN, *Practical* HELP FOR TOOL & DIE MAKERS!

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Reading, Pa. Dept. 10A-1

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## ALCOA Aluminum Fasteners

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A well-made spring unit is not the result of guesswork. It's planned that way. Lasting comfort and sound construction are achieved by correct design, good workmanship, and the use of the highest-quality spring wire.

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Silver Star Spring Wire is a one-purpose wire—engineered solely for use in bedding and upholstery springs. Because of its special analysis and careful processing, it is adaptable to virtually all spring designs and is readily coiled, knotted, and crimped. Scientifically produced in Bethlehem's modern wire mills, it must pass rigid specifications before shipment.

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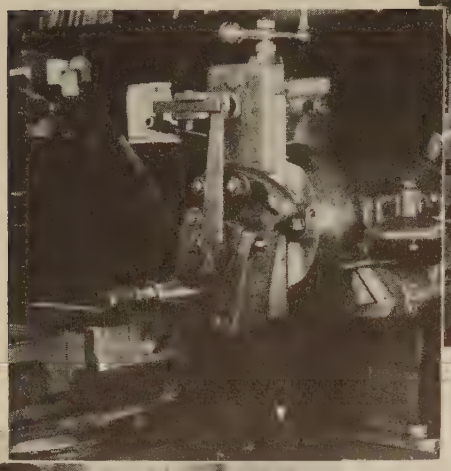
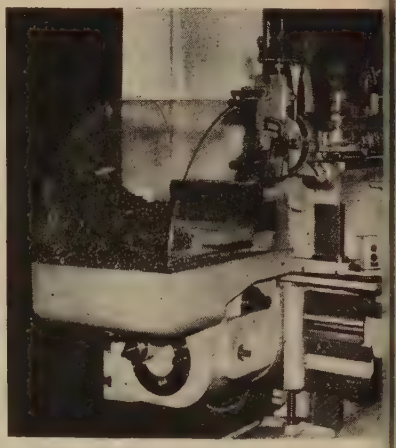
Power down feed speeds vertical facing and slotting.



The Cincinnati automatic tool lifter is essential for carbide tools and high speeds.



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Auxiliary front cross feed is very helpful for developing contours.

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## ...and wide utility, too!

Powerful Cincinnati Shapers are tailored to your needs—the many features available to you will both speed your job and widen the use of a shaper in your shop.

Cincinnati Shapers are accurate, speedy and versatile. They are the handy man of industry.

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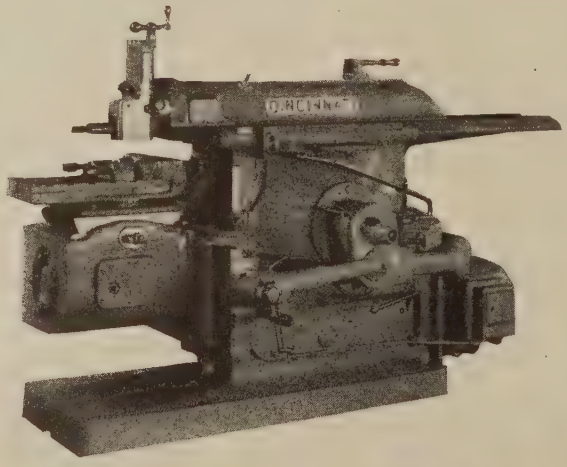

A Cincinnati Shaper with universal table is especially useful for tool room and die work.

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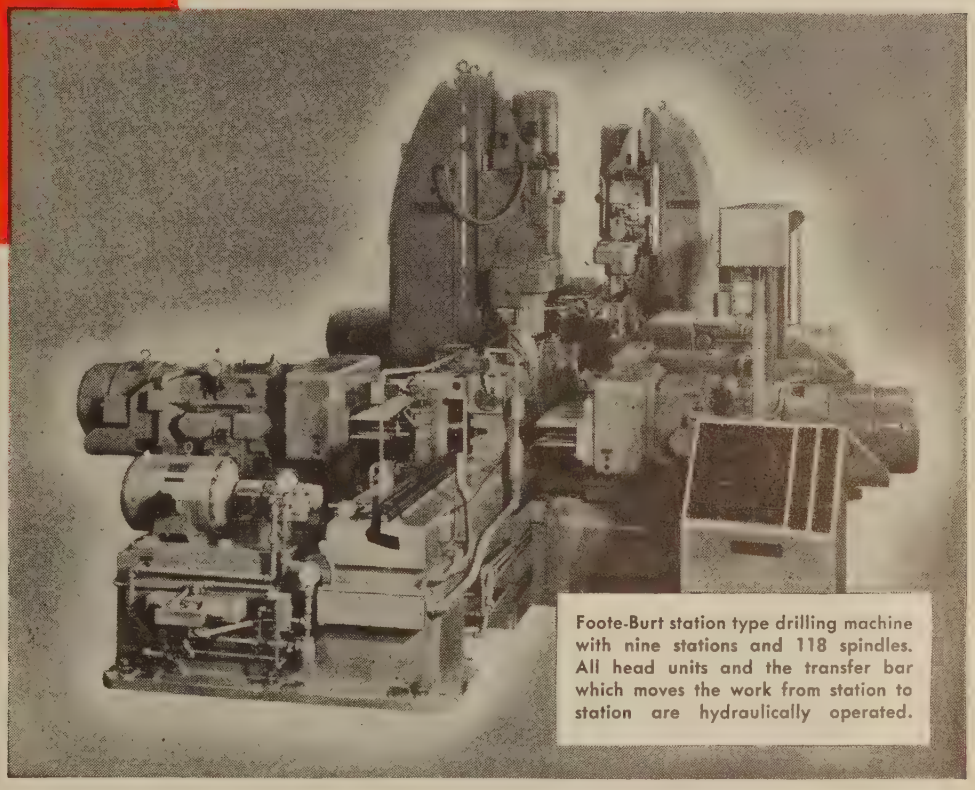

Foote-Burt station type drilling machine with nine stations and 118 spindles. All head units and the transfer bar which moves the work from station to station are hydraulically operated.

*Photo courtesy The Foote-Burt Company*

**Keep hydraulic systems clean . . . use *Texaco Regal Oils (R&O).***

*TEXACO REGAL OILS (R & O)* keep rust and sludge out of hydraulic systems. One user says: "Since using *Texaco Regal Oil (R & O)* we have greatly reduced machine down-time." Another says: "Since using *Texaco Regal Oil (R & O)* we have experienced smoother operation with no shut-downs or part replacements."

*Texaco Regal Oils (R & O)* are turbine-grade oils containing special inhibitors to prevent the rust and sludge formations that cause costly stoppages. They are also processed to prevent foaming. Their use assures more dependable operation . . . fewer production interruptions . . . lower maintenance costs.

Makers of hydraulic equipment are enthusiastic, too. Leading manufacturers recommend *Texaco Regal Oils (R & O)* . . . and many ship their units charged with them. There is a complete viscosity range of *Texaco Regal Oils (R & O)* . . . for every type and size of hydraulic unit.

Let a Texaco Lubrication Engineer give you full details. Just call the nearest of the more than 2500 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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**TEXACO Regal Oils (R&O)**

**FOR ALL HYDRAULIC UNITS**

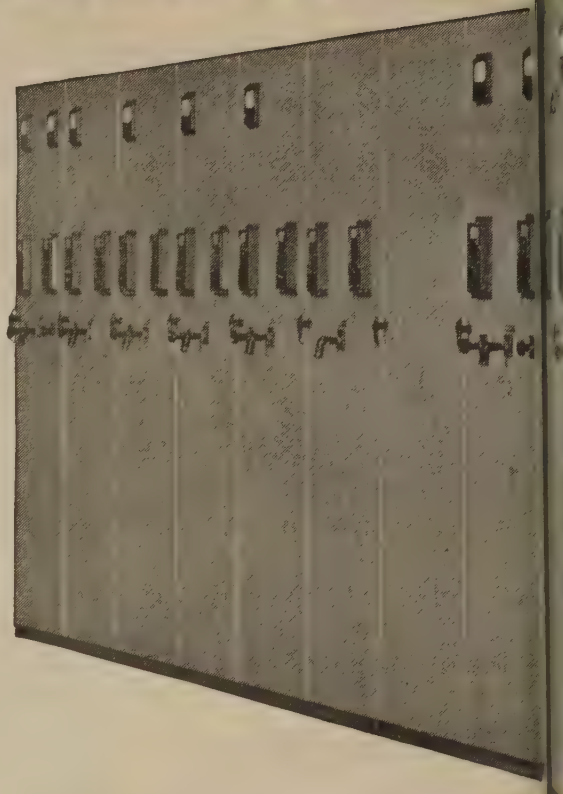
TUNE IN . . . TEXACO STAR THEATRE every Wednesday night starring Milton Berle. See newspaper for time & station.




*THE IRON AGE*, published every Thursday by the *CHILTON CO. (INC.)*, Chestnut and 56th Sts., Philadelphia 39, Pa. Entered as second class matter Nov. 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western

# Install *AIR BLAST* Metal-Clad

# PLAY IT SAFE!



## Guard Against Damage to Valuable Mill Equipment • Protect Rolling Mill Motors by Rapid Clearing of Faults • Provide Complete Safety for Your Men • Install Factory-Built, Factory-Wired Allis-Chalmers Metal-Clad Switchgear with *Air Blast* Circuit Breakers!

THIS IS THE *ONLY* DRAWOUT VERTICAL LIFT METAL-CLAD SWITCHGEAR equipped with *Air Blast* circuit breakers! That means a space-saving lineup of switchgear that is easily inspected and maintained . . . centralizes power control . . . protects personnel . . . and reduces potential fire hazards.

Drawout construction permits ready access to circuit breakers during inspection and maintenance—and interrupting with air blast reduces arcing time to less than a cycle insuring long contact life. *Air Blast* breakers are mechanically strong to withstand repeated "closing-opening" operations. *They consistently complete interruption within four to five cycles!* These 7.5 and 15 kv units have interrupting capacities of 250,000 and 500,000 kva.

For more information, contact your nearby A-C office, or write for *new* bulletin 18B6760. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

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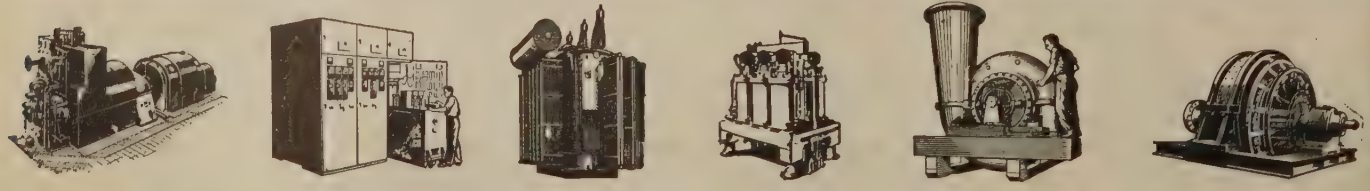

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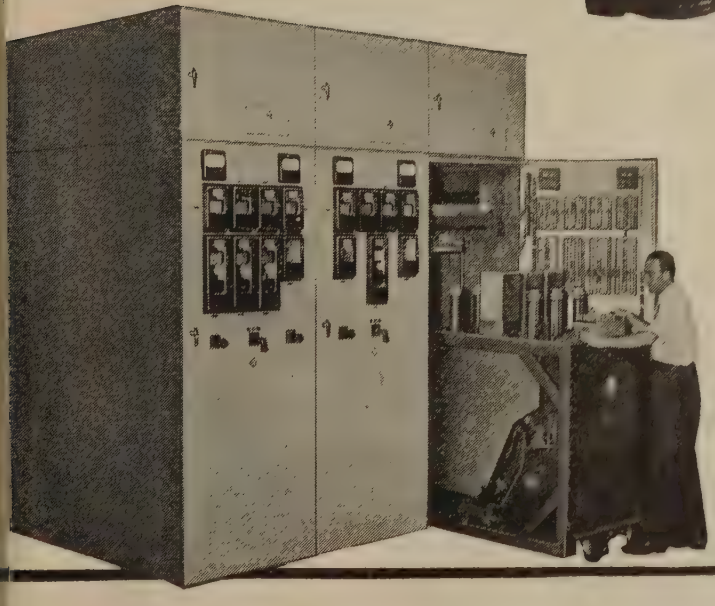
**UTILIZATION & PROCESS** — Motors, Blowers, Rectifiers, M-G Sets, Betatron, Pumps, Compressors, *Regulex* Exciters, *Texrope* V-Belt Drives . . .

# Switchgear and...



## MAINTENANCE IS EASY... FAST... SAFE!

LOWER BREAKER to floor by means of electrically operated motor-lift . . . pull it from structure . . . and roll it away to convenient test stand—that's all it takes! Breaker cannot be lowered when in the closed position because of positive interlocks . . . and automatic shutters prevent accidental contact with live parts—that's added safety for personnel during inspection and maintenance!

A 2360

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ENTRY END

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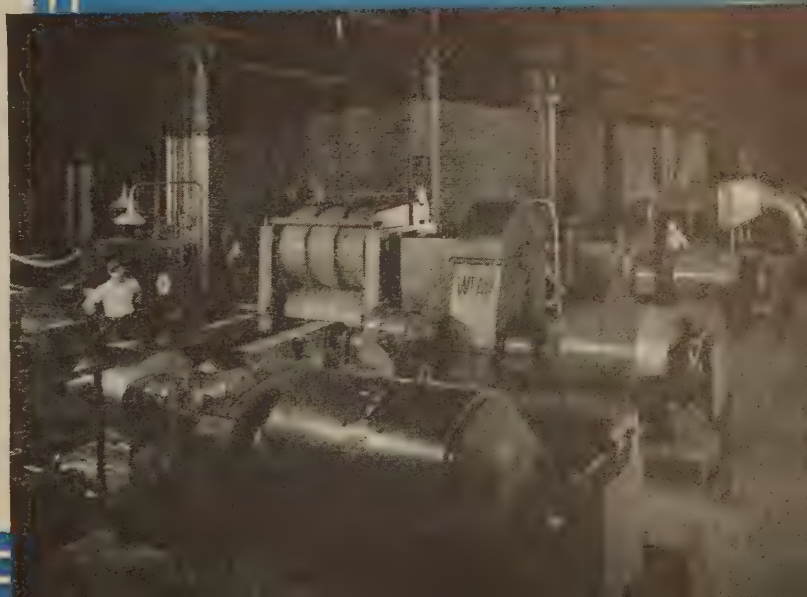
WARREN, OHIO

CLEANING SECTION

EXIT END



THE Wean "anodic cathodic" high speed electrolytic strip cleaning line represents the most advanced development in continuous strip cleaning. This line meets the most exacting requirements for subsequent coating operations.

**SPECIALISTS IN SHEET, TIN & STRIP MILL EQUIPMENT**

# Memo from our
## RAW MATERIALS DEPT.

**J&L STEEL**

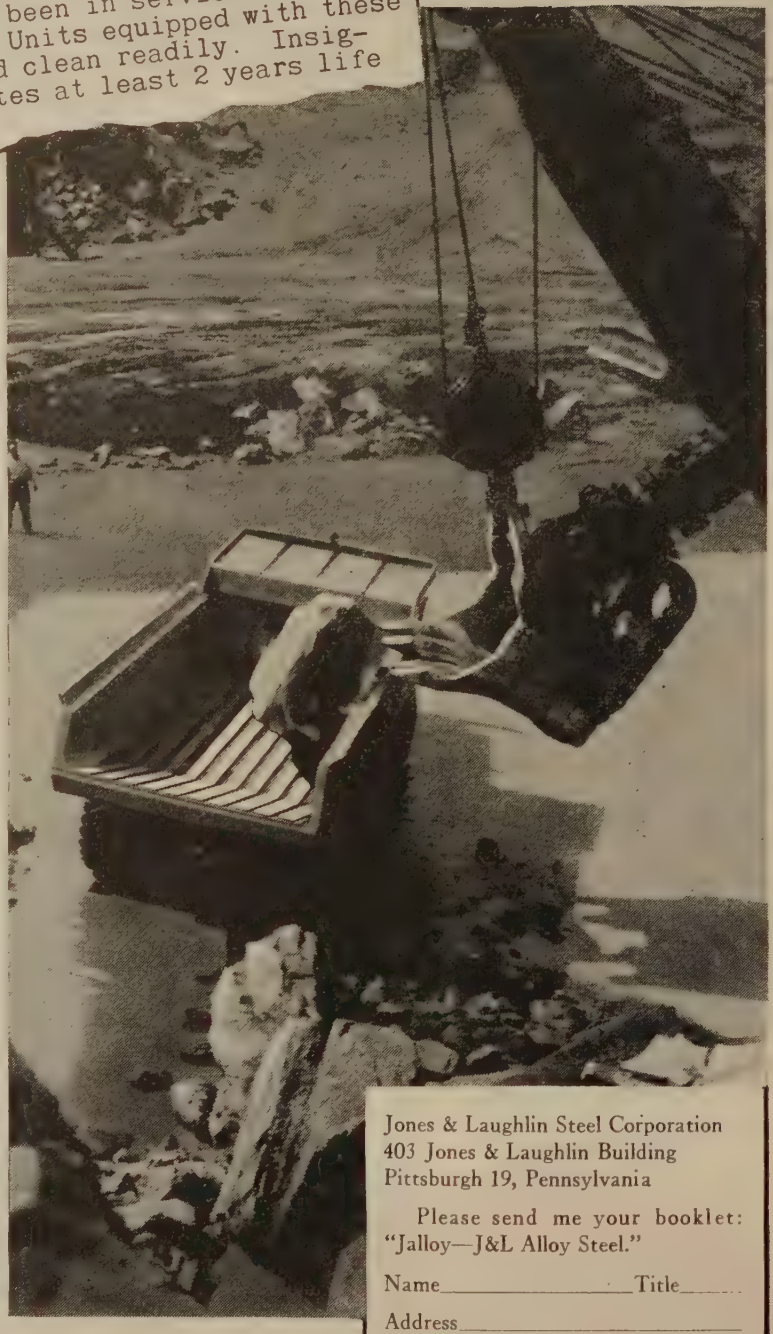
**JONES & LAUGHLIN STEEL CORPORATION**
OFFICE MEMORANDUM

DATE 8/11/48

TO. Metallurgical Dep't.

SUBJECT: Performance of Heat Treated JALLOY Steel at Benson Mines, Star Lake, N. Y.

1" x 6" heat-treated JALLOY #3 flats to reinforce truck-body bottoms and doors. Service--severe impact loading of hard rock magnetite ore from 5-yd. shovel. Year round operations in temperatures to minus 47°F. Severe abrasion in unloading. Installations have been in service 13 months --305,000 tons handled per truck. Units equipped with these flats maintain bottom flatness and clean readily. Insignificant wear at this date indicates at least 2 years life before replacement is necessary.



WHAT better "laboratory" could we find to prove the qualities of J&L Steel than in the equipment required in our own operations?

The handling and moving of heavy, abrasive ore-bearing rock, at our Benson Mines, is a rugged test for any equipment. Yet our stone trucks equipped with heat-treated J&L JALLOY Steel reinforcing strips have run *more than a year* without bottom replacements. *And recent reports indicate at least two years life!*

These JALLOY strips receive the full impact of huge rocks *dropped* into the truck bodies, and withstand the abrasion caused by dumping load after load. This continuous resistance to shock is particularly noteworthy because of the embrittling effect of the sub-zero temperatures encountered during winter months.

J&L JALLOY is a fine-grain, heat-treated steel made in a wide range of physical properties with tensile strengths of 155,000 to 180,000 lbs. per sq. inch. Its inherent ability to withstand shock and abrasion adds life to equipment that must be tough and strong—such as: Rock crushers, Scrapers, Bulldozers, Dump cars, Power-shovel buckets, Truck bodies, Sandblasting equipment—or wherever abrasion and impact are limiting factors.

Manufacturers of trucks and trailers designed for heavy service will find JALLOY an excellent material for body bottoms, reinforcing strips exposed to severe abrasion, tail gates and many other applications. You'll find that JALLOY is a steel that stands up when the going gets tough. For more complete information, let us send you the booklet: "*Jalloy*—J&L *Alloy Steel*." It includes data on properties, heat treatments and workability. The coupon at the right is for your convenience.

Jones & Laughlin Steel Corporation
403 Jones & Laughlin Building
Pittsburgh 19, Pennsylvania

Please send me your booklet: "Jalloy—J&L Alloy Steel."

Name_____ Title_____

Address_____

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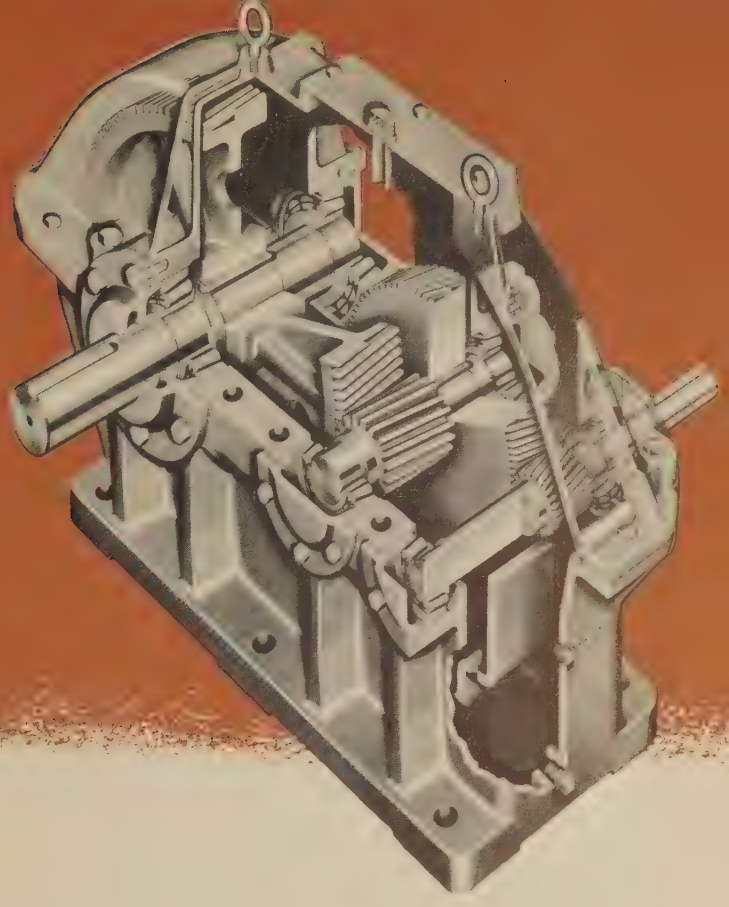
**JONES & LAUGHLIN STEEL CORPORATION**

# HARNESS

RPM

## WITH WESTINGHOUSE SPEED REDUCERS



### HERE'S EFFICIENT, ECONOMICAL REDUCTION FOR ANY PRIME MOVER . . .

Westinghouse Speed Reducers provide the speed-reduction ratio needed—with high power-transmission efficiency. Rugged, durable and powerful, they are particularly suited for heavy-duty operations, for drives up to 1,000 hp.

This ruggedness and high efficiency is achieved by skillful design and precision manufacturing methods, the result of over half a century of Westinghouse experience in producing gearing and geared drives. It's your assurance that the drive you buy meets your requirements for accuracy and dependability.

**WESTINGHOUSE IS HEADQUARTERS FOR INDUSTRIAL GEARING,** with specialized facilities for the design and production of spur, single-helical or double-helical types, up to 10 ft. in diameter. Your gearing inquiries will be given immediate attention. Orders are filled promptly —manufacturing facilities are immediately available.

TYPE DH DOUBLE-REDUCTION SPEED REDUCER is available in 15 standard ratios in each of 12 sizes. TYPE SH SINGLE-REDUCTION SPEED REDUCER available in 13 standard ratios in each of 12 sizes.

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- **SINGLE-HELICAL GEARING**—heat-treated by the exclusive Westinghouse BPT process
- **ANTI-FRICTION BEARINGS**—for reduced power losses
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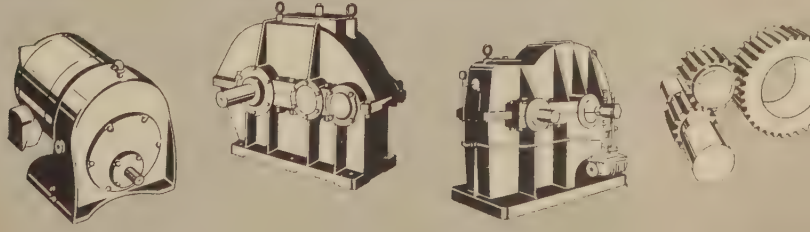
RPM FITTED DRIVES



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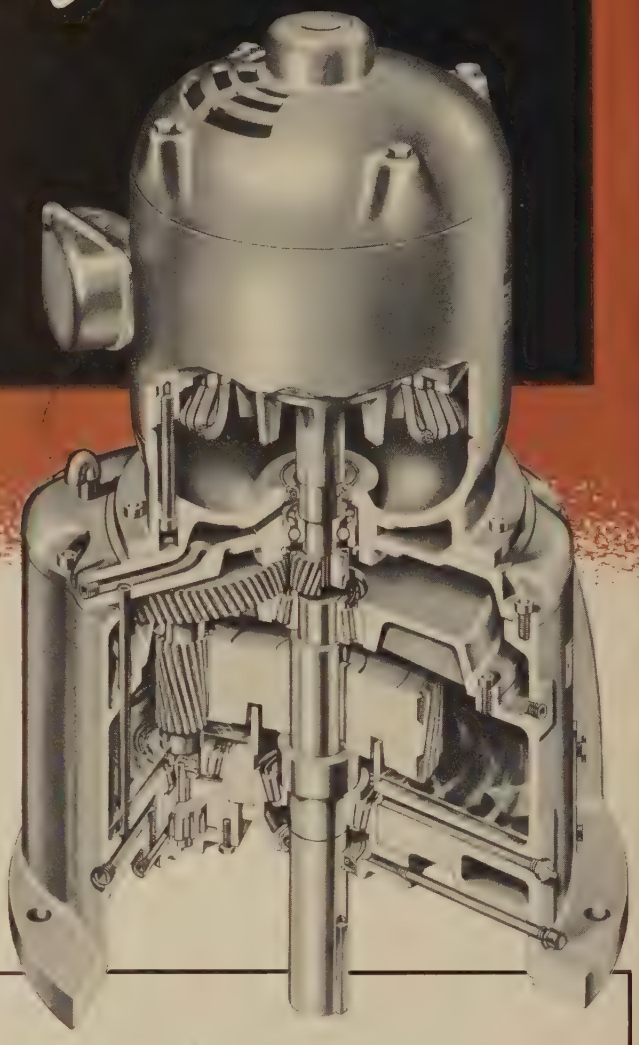
*The New Westinghouse*

# VERTICAL GEARMOTOR



## —powered by the revolutionary new Westinghouse Life-Line Motor

Here's a vertical gearmotor that's new . . . in its streamlined appearance . . . and in advanced features that improve power transmission and cut maintenance costs. It's the Westinghouse Type M—designed for utmost efficiency, powered by the Westinghouse Life-Line Motor. It takes its place as an important member of the popular line of Westinghouse Geared Drives —which includes horizontal gearmotors for applications up to 75 hp.

Each unit is a self-contained drive, available in ratings of 3 to 50 hp—in a range of ratios from 7.61:1 to 38.9:1—in a choice of enclosure types, including open-protected, semi- or totally-enclosed, and explosion-proof.

Compact and easy to install, the Westinghouse Type M Gearmotor will solve your vertical slow-speed drive problems. Ask your Westinghouse representative for help on your applications.

**FEATURES OF THE *NEW TYPE M GEARMOTOR . . .***

- **POSITIVE LUBRICATION** of gears and bearings at all operating speeds
- **BPT HEAT TREATMENT** of gearing, to assure maximum load-carrying capacity and long service life
- **EASY ACCESSIBILITY** for inspection and maintenance
- **SIMPLIFIED DESIGN** . . . new, streamlined appearance
- **POWERED** by Life-Line Motor . . . greatest advance in motor design in 58 years

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PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

# 4 things you should know to make better forgings

1. The maximum forging temperature of the steel

2. How the ductility of the steel changes with varying temperatures

3. The force required to form the steel at varying temperatures

4. Whether the steel has uniform quality

## —and here's how to find the answers

FOR the best results in forging, make sure you (a) have the complete forgeability data of the particular analysis used, and (b) use Timken alloy steel.

Using the hot-twist method, metallurgists of The Timken Roller Bearing Company have tested the forgeability of 97 analyses. Their findings have been compiled in a 112-page, Timken Company book, "Evaluating the Forgeability of Steels". It's yours for the asking.

Regardless of the analysis you use, Timken forging quality alloy steels assure uniform forgeability, superior surface and internal quality, and unvarying composition and response to heat treatment, from bar to bar and from heat to heat. That's why better forgings are made at less cost with Timken alloy steels. The Timken Roller Bearing Company, Steel & Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

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*Fine Alloy*

**STEEL**

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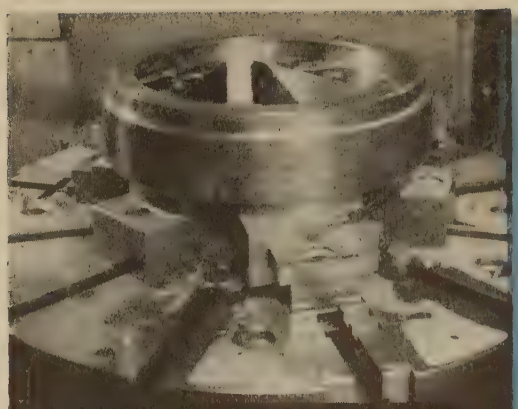
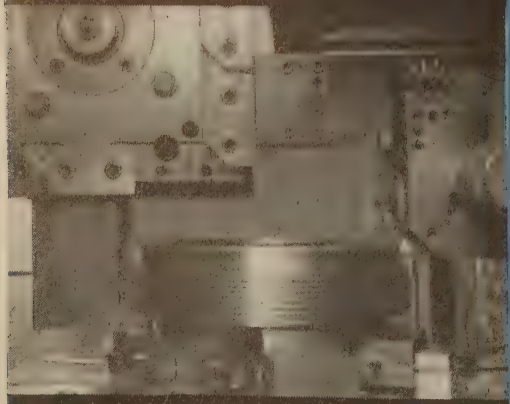
*Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing*



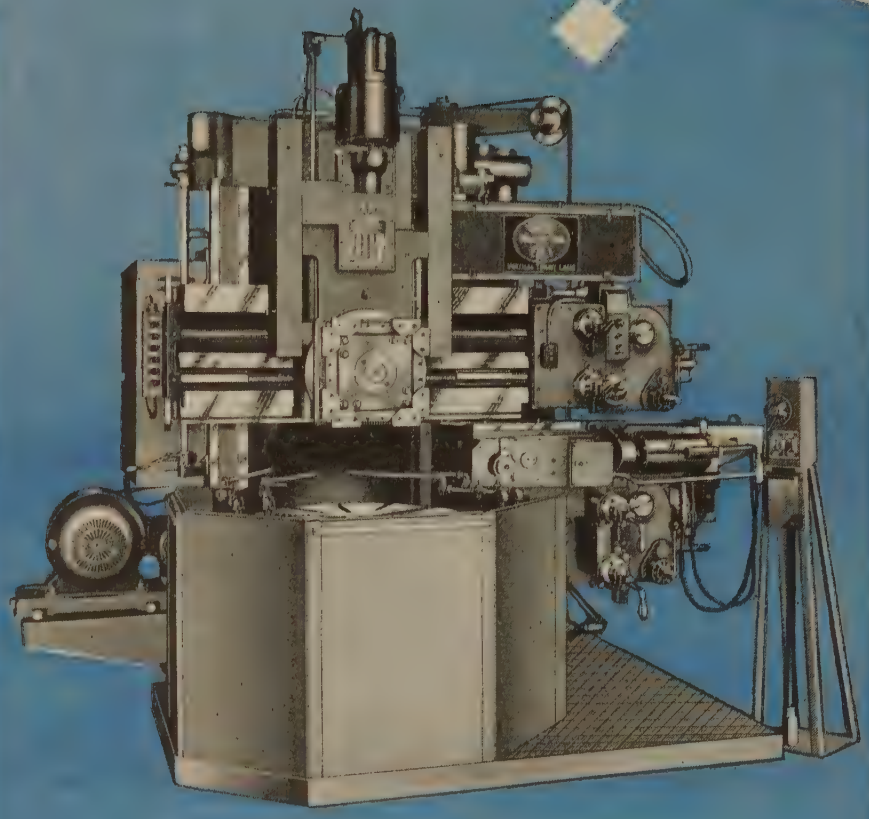
Here's the brake drum ready for the outside diameter and radius turning operation. The inside has already been semi-finished.

This is the first finning operation—finish turn OD of fins and semi-finish turn shoulder diameter—face flange and form shoulder radius and rough cut fins.

Here Man-Au-Trol utilizes the angular turning attachment to generate the top surfaces of the fins. 5 cutting tools instead of 3 are working simultaneously as in the roughing operation.



This is the final finning operation—the under surfaces of the fins are generated, using 5 cutters in the turret head, while side head turns the shoulder.



**BULLARD 30" Man-Au-Trol Vertical Turret Lathe versatility solved a brake drum problem for Copperweld Steel Company Brake Drum Division. It reduced the machining time for their delicate finning operation from 80 minutes per drum for the only previously successful method to 18 minutes per drum. The Man-Au-Trol method not only successfully provided a finning method, but also took additional cuts not previously possible without additional set-ups.**

Several of the Man-Au-Trol functions are pictured and described on the accompanying close-ups.

## BULLARD CREATES *NEW*

# BULLARD MAN-AU-TROL

## PRODUCES

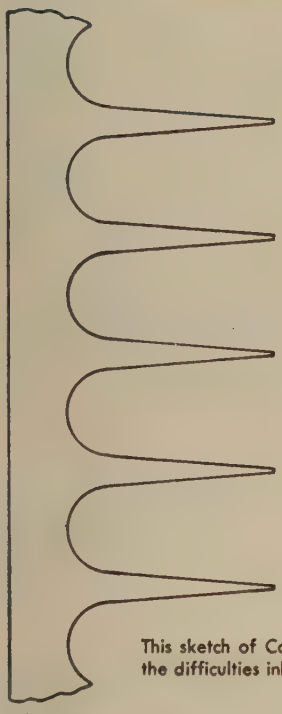
**UNIQUE**

*Copperweld*

**BRAKE DRUMS**

**MORE THAN**

**4½ TIMES FASTER**



This sketch of Copperweld Brake Drum fins illustrates the difficulties inherent in this job.

BULLARD
MAN-AU-TROL
MASTER OF THE MACHINE

You, too, can set new production records with BULLARD Man-Au-Trol Vertical Turret Lathes. No other machine combines productivity, versatility and accuracy on such a lavish scale. Bulletin MAV-G-1 proves it. Write for your copy today. THE BULLARD COMPANY, Bridgeport 2, Connecticut.

***METHODS*** TO MAKE MACHINES DO MORE

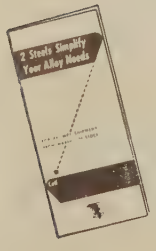
*IDEA to Make Selection Easier*

# TWO ALLOY STEELS THAT CAN MEET 95% OF YOUR NEEDS

| ROCKWELL HARDNESS | WHAT YOU GET | HOW TO USE IT |
|---|---|---|
| C-62<br>55 | ***use Carpenter No. 158 Case-Hardened*** | A case-hardening alloy steel for parts demanding an extremely hard surface. Resistance to shock also important. When you need these, there is only one "best" steel to use. | Use No. 158 annealed. Machine parts, then carburize and harden. Result—high case hardness and core strength. |
| 50<br>45 | ***use Carpenter No. 5-317 Hard-Tempered*** | A hard-tempering alloy steel to take a good gear temper. Combination of good surface hardness with strength and toughness. (Rockwell C-47/55. Brinell 450/550). | Use No. 5-317 annealed. Machine and heat treat. Draw between 400° F and 650° F for desired hardness. |
| 40<br>35 | ***use Carpenter No. 5-317 Tough-Tempered*** | A tough-tempering alloy steel to take a good shaft temper. Where strength and toughness are needed. (Tensile 150,000 to 250,000 p.s.i. Rockwell C-32/46. Brinell 300/450). | Use No. 5-317 annealed. Machine and heat treat. Draw between 650° F and 1050° F for desired hardness. |
| 30<br>25 | ***use Carpenter No. 5-317 as Heat Treated at Mill*** | A mild-tempered alloy steel that can be readily machined in the treated condition as received. (Rockwell C-24/31. Brinell 250/300). | Use No. 5-317 as heat treated at the mill. Machine parts and put into service without any further heat treatment. |

*Good Way to SAVE on Maintenance Jobs*

These two steels are widely used for gears, shafts, collets, cams, bolts, etc.




**HERE'S USEFUL INFORMATION**

about the jobs these 2 steels can do for you. To compare these 2 steels with the S.A.E. alloys you are now using, write for a personal copy of the booklet, "2 Steels Simplify Your Alloy Needs".

***RUSH*** **DELIVERY FROM CARPENTER WAREHOUSES**

BRIDGEPORT, CONN. • BUFFALO
CAMBRIDGE, MASS. • CHICAGO • CINCINNATI
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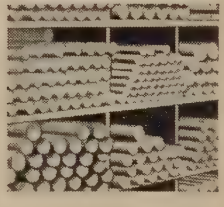


**THE CARPENTER STEEL COMPANY, 121 West Bern St., Reading, Pa.**

*Export Department*
233 BROADWAY, NEW YORK 7, N. Y.
"CARSTEELCO"

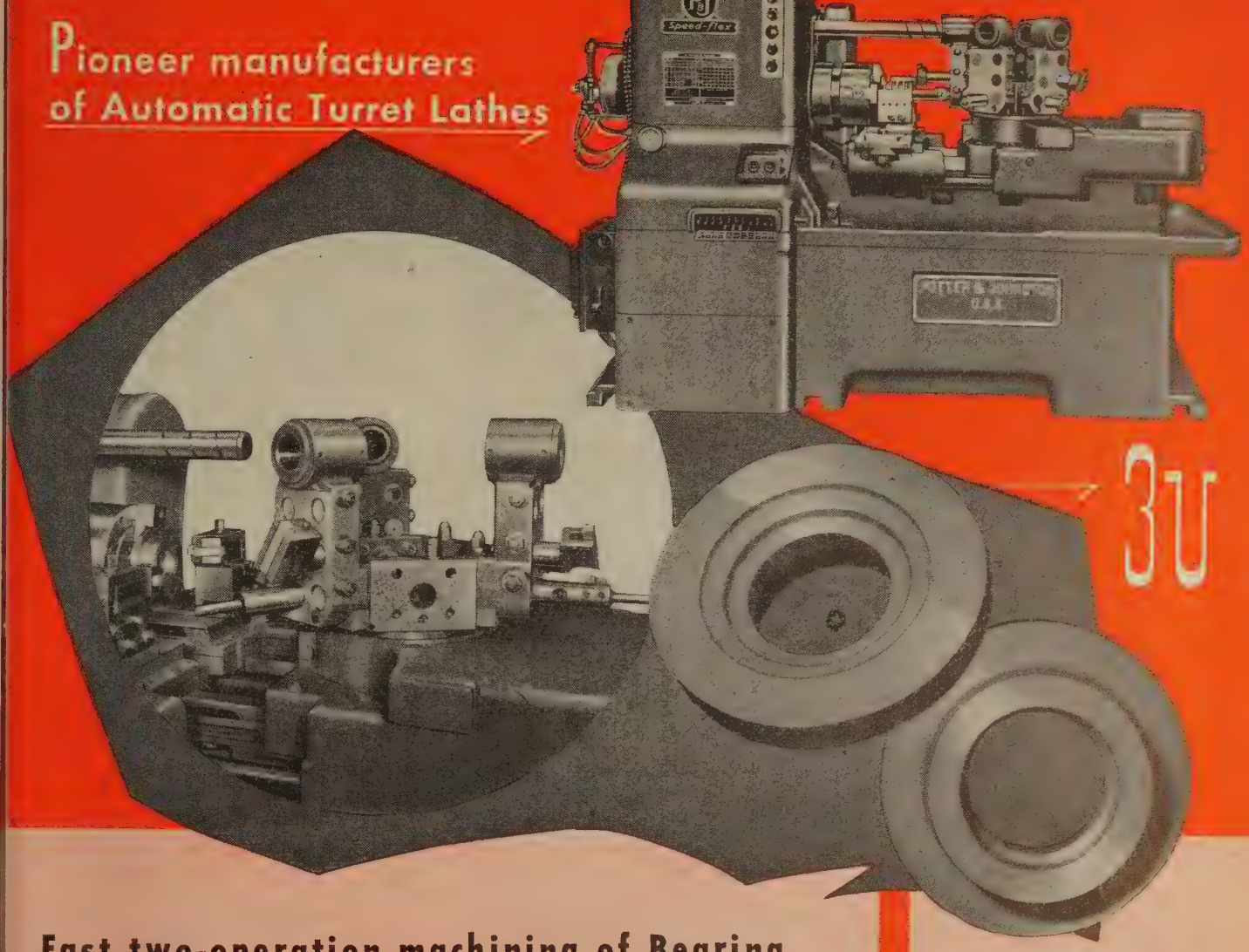
*Carpenter*

**QUALITY-CONTROLLED**

# ALLOY STEELS

***. . . made in a tool steel mill***
***. . . inspected to tool steel standards***

Pioneer manufacturers of Automatic Turret Lathes



3U

## Fast two-operation machining of Bearing Quills on a P&J3U SPEED-FLEX

The job illustrated and described here, gives an excellent idea of the possibilities of the new 3-U SPEED-FLEX Automatic Turret Lathe designed especially for handling small chucking work at fast production rates. It is specially tooled to complete the machining required in two operations. Average floor-to-floor time for the first operation is 1.22 minutes; second operation is performed in 1.47 minutes. Work is chucked in one position for the first operation and in another position for the second operation. One operator can readily handle several machines.

This outstanding performance of the 3-U Speed-Flex is being consistently duplicated on a wide range of other small chucking work, conclusive evidence that Potter & Johnston has met an urgent need for a high speed machine of this type and capacity. If you have a problem involving the low-cost production of small duplicate parts, ask P&J Methods Engineers for recommendations.

## DETAILS OF JOB

*Part:* Bearing Quill

*Material:* Grey Iron

*Method and Operation:*

*(1st Operation)*

Presenting hub side to spindle grip on flange with 3 chuck jaws.

*Machine as follows:*

1st T.F.: Rough bore 2¼" dia.; face one side of flange.
2nd. T.F.: Finish the above cuts; chamfer where necessary.

*(2nd Operation)*

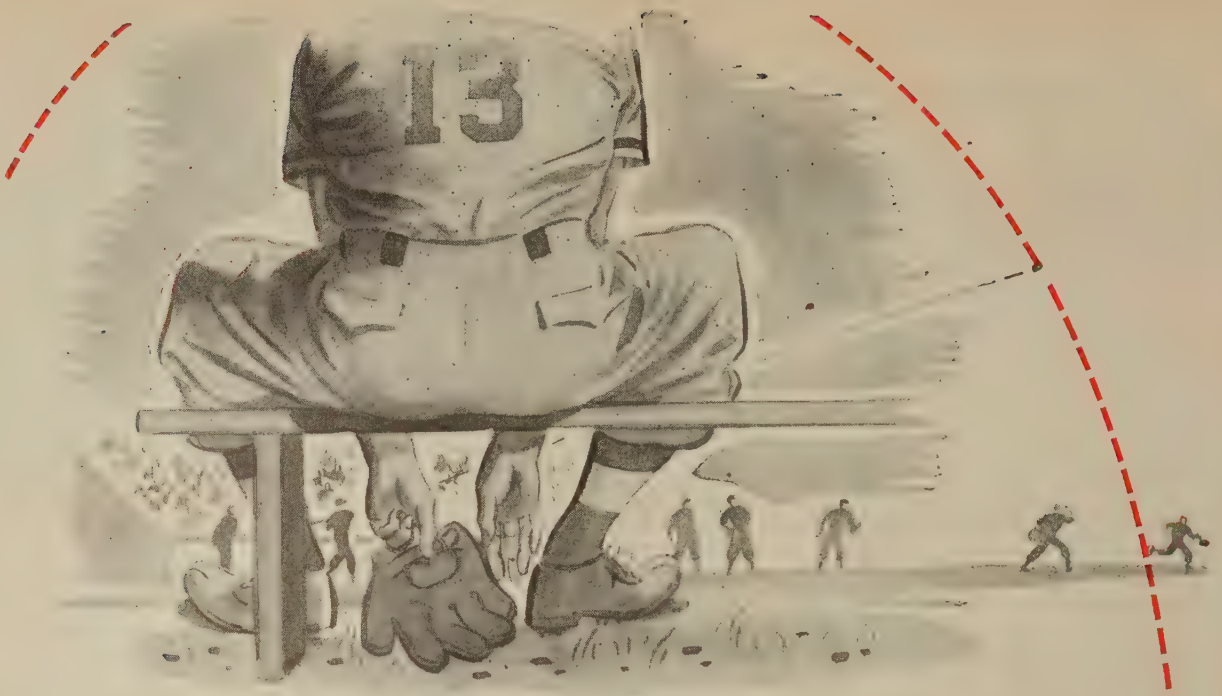
Presenting flange side to spindle grip in 2¼" dia. hole with 3 chuck jaws.

*Machine as follows:*

1st. T.F. Rough bore 2.4995"; rough face flange turn 3.562" dia.; face end; turn O.D. of flange.
2nd. T.F.; Finish the above cuts; chamfer.
3rd. T.F.: Ream 2.4995" dia.
4th. T.F.: Size turn 3.562" dia. and 4.937" dia.

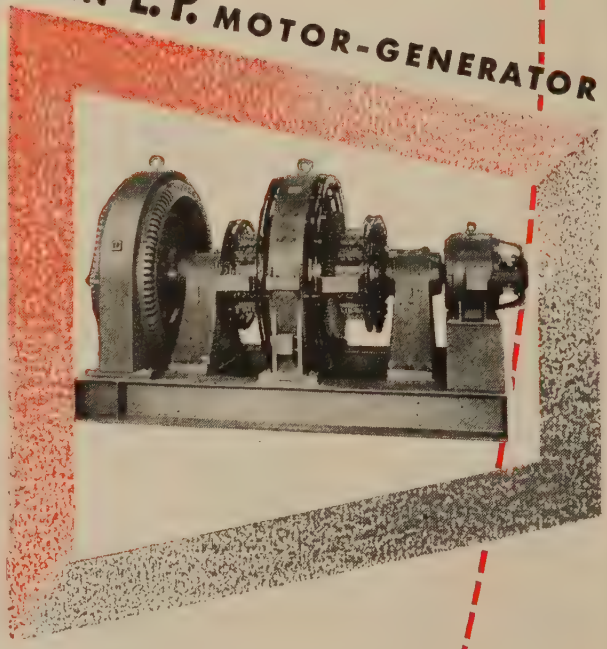
*Pieces per hour* (1st Operation): 41.5
*Pieces per hour* (2nd Operation): 34.8

**POTTER & JOHNSTON COMPANY**
PAWTUCKET, R. I.
*Subsidiary of*
PRATT & WHITNEY
*division Niles-Bement-Pond Company*



# THE "First stringer" IS ALWAYS BETTER

## USE AN E.P. MOTOR-GENERATOR



Endurance, specialized ability and ruggedness . . . these are the three chief differences between the "first stringer" and the "bench-warmer." And they are the main reasons why the E.P. Motor-Generator has been chosen to supply hundreds of thousands of direct-current amperes throughout the metal-working industry for electroplating, electrocleaning, electrotinning, electrogalvanizing, electropolishing and anodizing.

Continuous duty for over twenty years is common for an E.P. Motor-Generator. Tailor-made for the specific electrolytic process, it assures economies unmatched by ordinary commercial machines. Unaffected by the corrosive atmospheres common to most electrolytic operations, it requires no special protective equipment. There's no production "time-out" with an E.P. Motor-Generator.

Where long life is desired . . . where top efficiency is demanded . . . where minimum maintenance is a must, specify an E.P. Motor-Generator.

**ASK FOR BULLETIN 202**

EP X-41

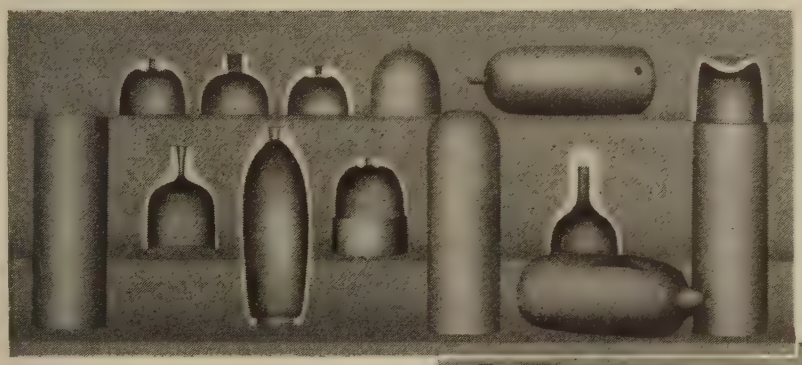
# THE ELECTRIC PRODUCTS COMPANY

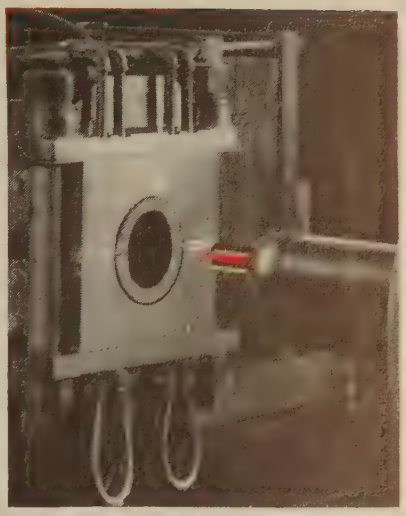
1738 CLARKSTONE ROAD CLEVELAND 12, OHIO

# Federal

announces

# "THE WESTIN PROCESS"





PATENTED

HERE'S a really new way to form tubular sections. Far more efficient than conventional methods in use today, the revolutionary Westin Process is performed by a combination of electrical current and pressure. Its application means considerable savings in time and material and a greatly improved product quality. Developed to enable manufacturers to achieve lower unit cost of production, this new process is particularly adaptable to forming steel gas cylinders, upsetting sections of tubing to increase wall thickness, sealing tube ends, necking-down tube sections and performing other high-production operations of a related nature on low carbon, alloy steel, brass and other metals.

The Westin Process is one more example of how Federal is making every effort to reduce costs and increase production and quality in the metal working field.

When forming tubular sections, it will pay to look into the Westin Process. The illustrations on this page are intended only to set you to thinking about your own production. It costs nothing to inquire.

*Federal is equipped to handle every type of metal forming or resistance welding application. Let our engineers analyze your product and show you new economies in your press and welding operations.*

Federal WELDERS

RESISTANCE WELDERS FOR EVERY APPLICATION
FROM 50-TON OBI TO 2000-TON DOUBLE ACTION

Warco PRESSES

**THE FEDERAL MACHINE AND WELDER COMPANY**

Dept. 798 Plant 2, Warren, Ohio • • Offices in Principal Cities

# Is your plant an easy target for corrosion?

EVERY year, rust and corrosion exact a terrific toll from industry . . . billions of dollars in fact. But you can easily cut your plant's contribution—and it *is* a contribution—by using Koppers Industrial Protective Coatings.

For example, here's how Koppers Bituplastic* protects metal, concrete or masonry: Bituplastic (it's not a paint) coats exposed surfaces with a tough film. This protective film is thick; three coatings of Bituplastic build up a seamless, non-porous sheath nearly 1/16" in thickness—a sheath that not only resists water, but the assaults of sun, salt air, condensation, atmosphere, weather, and acid or alkaline fumes.

Read the list of other advantages offered by Bituplastic. And for complete data, including suggestions for use and rate of coverage, send for our new Bulletin on Bituplastic.

## 8 Other Advantages of Bituplastic...

1. *It is a highly-refined, easily-workable coal-tar pitch coating.*
2. *It covers heavily; 1/64" to a coat, or about 5 times the thickness of ordinary paint.*
3. *It does not "alligator" or check.*
4. *It is applied cold with brush or spray.*
5. *It is fire retardant.*
6. *It does not crack at minus 50°F. or sag at 500°F.*
7. *It is practically odorless and tasteless.*
8. *It dries quickly.*

*Trade-Mark Reg. U. S. Pat. Off.

**KOPPERS COMPANY, INC., Dept. 906T, Pittsburgh 19, Pa.**

---

**IMPORTANT!** *Plant engineers and maintenance men agree that* specialized *protective coatings are needed to control corrosion. Remember that Koppers makes 6 Protective Coatings, all specifically formulated to protect under severe conditions.*

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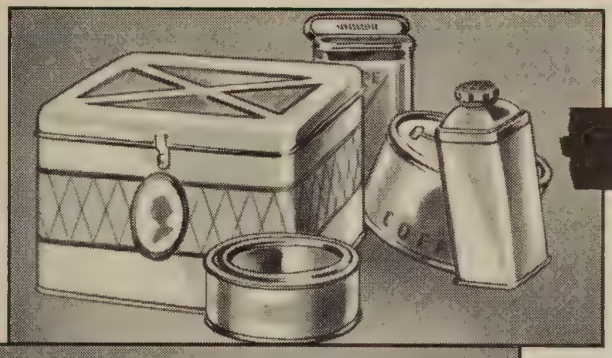
# when you need TIN MILL PRODUCTS

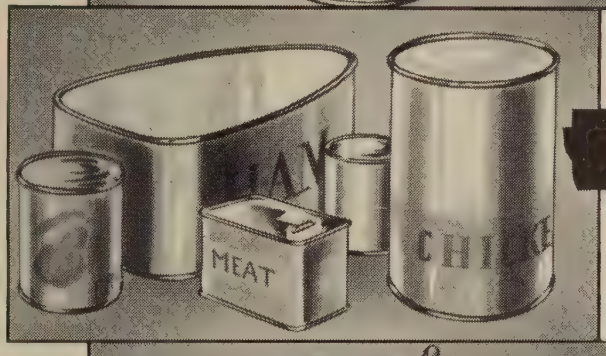
GET

# WEIRITE

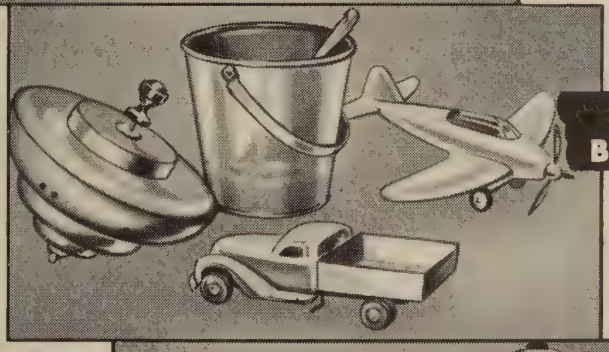
QUALITY



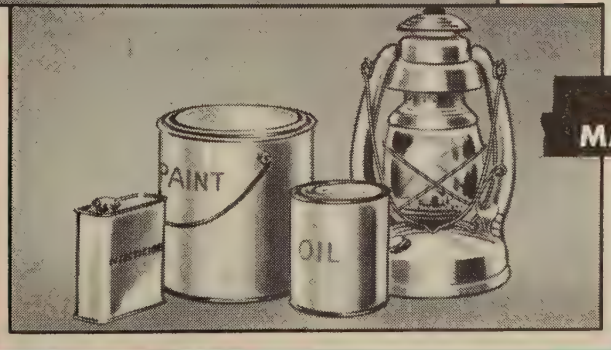
ELECTROLYTIC TIN PLATE




HOT DIP TIN PLATE



TIN MILL BLACK PLATE

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Weirite Tin Mill Products offer the quality that comes from complete control of materials from mine to packaged product and rigid process control every step of the way. The latest and most scientific facilities are always on the job. So when you need tin mill products, get WEIRITE quality.

WEIRTON STEEL COMPANY

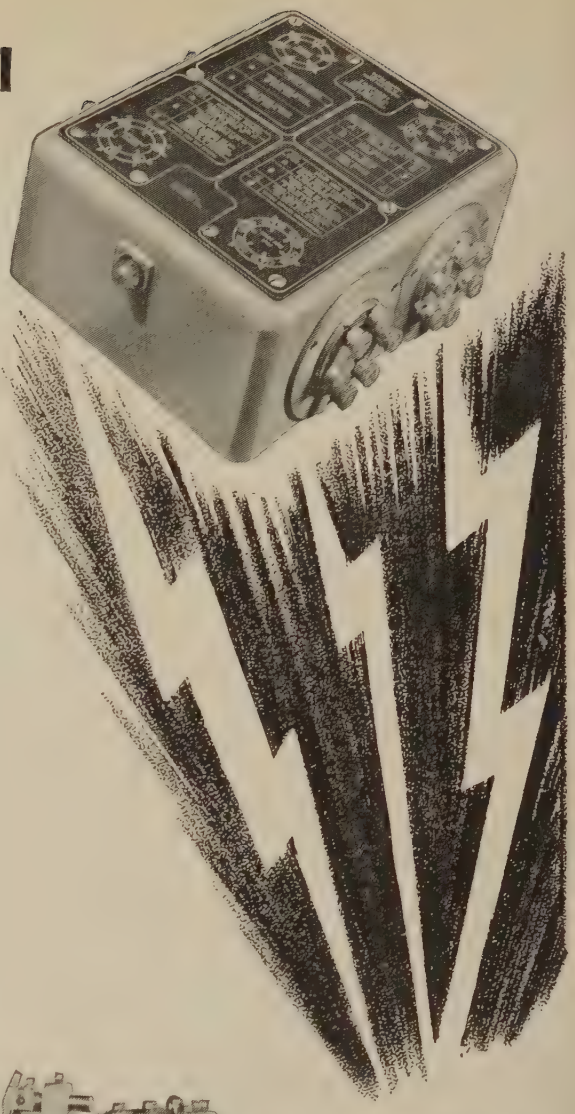
## WEIRTON STEEL CO.

**WEIRTON, W. VA.,** *Sales Offices in Principal Cities*

Division of **NATIONAL STEEL CORPORATION** *Executive Offices, Pittsburgh, Pennsylvania*

# New *Electro-Cycle* Control for *Faster, Easier* Turning of All Metals

TRADE MARK

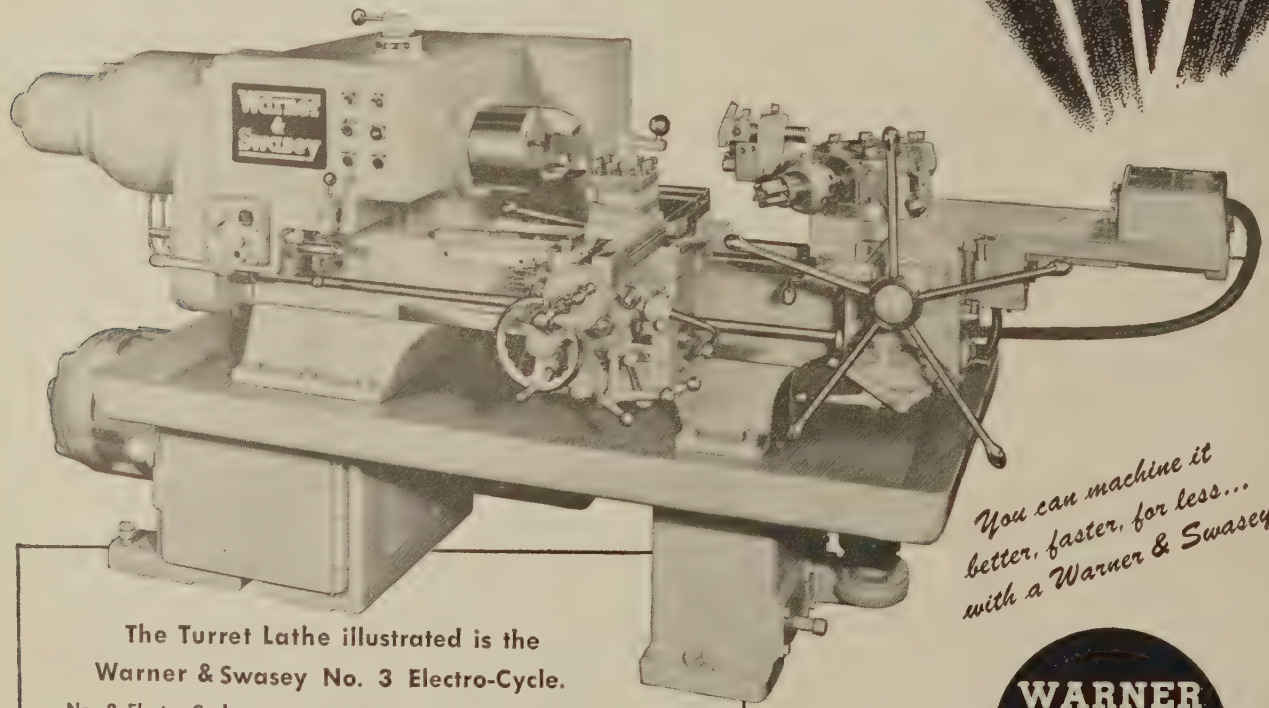


MOST of the time-taking, tiring manual operations are eliminated for the turret lathe operator when the Electro-Cycle control takes over.

This automatic control directs the functioning of the spindle for each hex turret face. Spindle start, direction of rotation, speed changes, reversal and stop, and positioning for ease in loading are all automatically controlled.

First introduced for machining non-ferrous materials, the Electro-Cycle principle is delivering big production increases in non-ferrous shops. Now the same principle is available in the new Warner & Swasey No. 2 and No. 3 Electro-Cycle Turret Lathes for faster, more profitable turning of all metals.

After studying your jobs, a Warner & Swasey field man can tell you if the Electro-Cycle machines fit into your operation. Better look into it—now!




*You can machine it better, faster, for less... with a Warner & Swasey*

**The Turret Lathe illustrated is the Warner & Swasey No. 3 Electro-Cycle.**

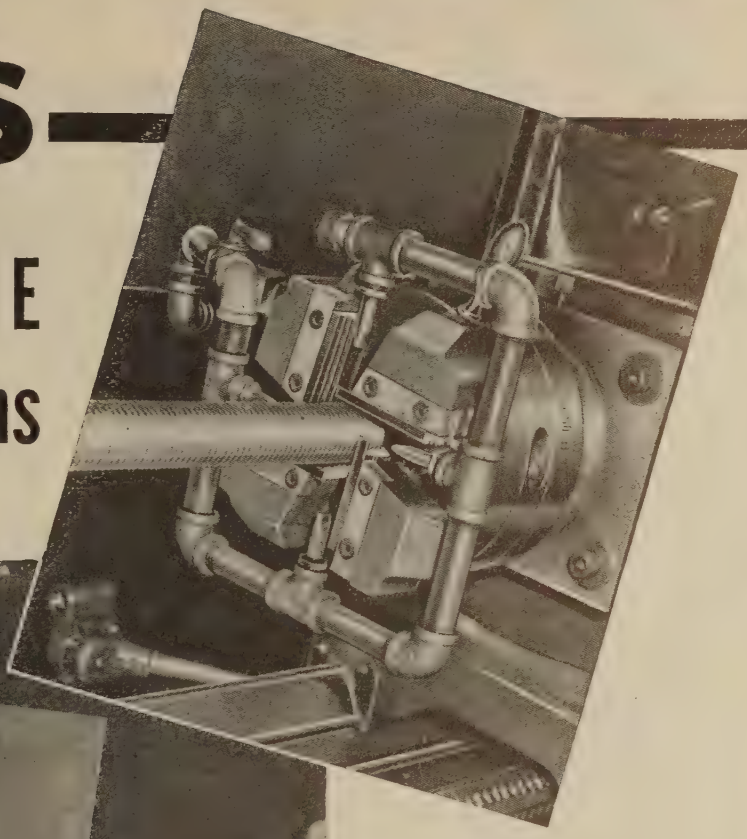
| No. 2 Electro-Cycle | No. 3 Electro-Cycle |
|---|---|
| 1" Bar Capacity | 1½" Bar Capacity |
| 14" Chucking Swing | 15⅜" Chucking Swing |
| Four quick change 4-speed drives from 105 to 3600 R.P.M. | Six quick change 4-speed drives from 85 to 2500 R.P.M. |

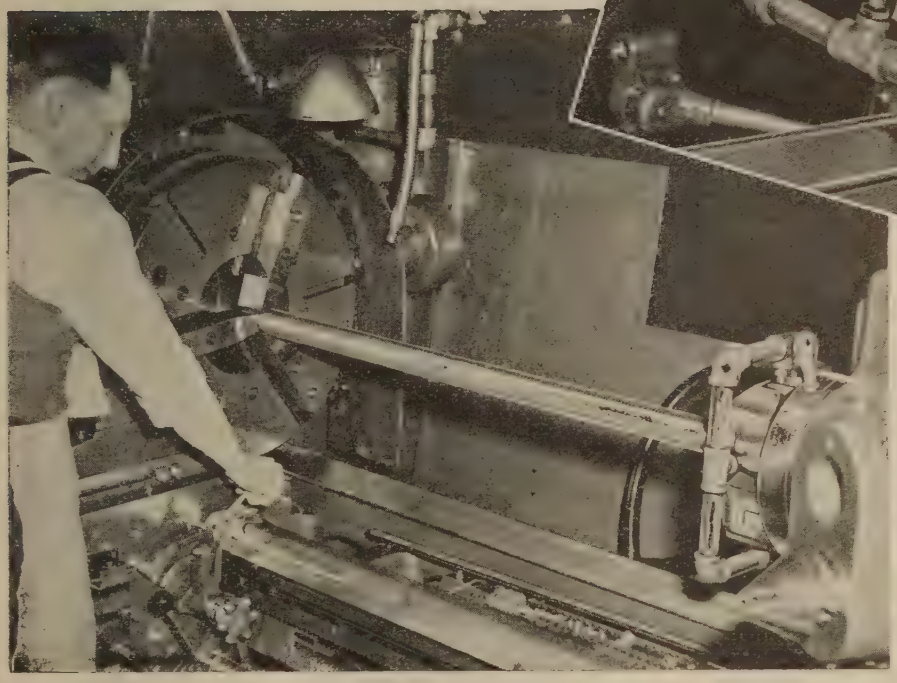
**WARNER & SWASEY**
*Cleveland*

TURRET LATHES, MULTIPLE & SINGLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES

# LANDMATIC Heads—

## For TURRET LATHE Threading Operations





Illustrations show a 3" LANDMATIC Die Head used by a Western aircraft company to thread long Wing-Flap Retracting Screws to extremely close tolerances. An Acme thread of 2" diameter, 4 threads per inch, is being cut to a length of 45½" on heat treated alloy steel tube 48" in length.

Thread lead and pitch diameter are held within aircraft tolerances. Concentricity of thread with the O.D. of tubing and smooth finish is assured by the use of Landis tangential type centering throat and roughing and finishing form chasers. Centering throat section of the chasers takes a bearing on the O.D. of the tubing, eliminating an out of round condition that often exists when long work pieces are being threaded.

"Only one cut is taken in forming the thread from the blank tube. This results in a tremendous saving in time over the former practice of chasing and grinding the threads," writes the manufacturer.

***Write for Bulletins F-80 & F-90***

LANDIS
REG U.S. TRADE—MARK PAT. OFF

# LANDIS MACHINE COMPANY

WAYNESBORO, PENNA., U.S.A.

# Why this pickling hook is still in service AFTER 10 YEARS

These MONEL pickling hooks have handled coiled wire in pickling solutions—a ton at a time—for more than ten years, *and are still in service.* They are installed at the Birmingham mill of Lamson & Sessions.

More than a decade ago, Lamson & Sessions purchased MONEL* pickling hooks for service in their Birmingham, Alabama mill. The hooks were to be used in pickling coiled wire—a ton at a time.

*Today, 10 years later, those same pickling hooks are still in service.*

This is an outstanding service record—but users of MONEL pickling equipment know that it is not an unusual one. For MONEL is an alloy with a combination of properties that make it a *preferred* metal for pickling equipment.

★ ***High resistance to corrosion:*** **Hot pickling solutions have no appreciable effect on MONEL.**

★ ***High strength.*** **MONEL is stronger than structural steel. You can make your equipment *lighter* without sacrificing strength, which means increased pay loads.**

★ ***Hardness, toughness.*** **MONEL's resistance to abrasion cuts down on wear at critical friction points.**

★ ***Good Workability.*** **MONEL can be machined, formed, and welded, without special equipment. And what is extremely important in pickling applications, MONEL welds are *corrosion-resistant.***

★ ***Availability.*** **Your nearest INCO distributor stocks MONEL in standard mill forms such as sheet, bar, rod, wire, and tubing. MONEL screws, bolts, and rivets are also stocked in commonly-used sizes. If you prefer to have your pickling equipment made for you, many of the nation's leading fabricators are experts in handling INCO Nickel Alloys. A letter to INCO will bring you a list of these established fabricators.**

If you are contemplating new pickling equipment or planning to rebuild old installations, you will want to know more about MONEL. Our Technical Service Department will gladly make recommendations based on test data and the experience of other concerns. Why not write—today—and ask for your free copy of *Where Monel Pays Its Way in Pickling?*

*Reg. U. S. Pat. Off.

EMBLEM OF SERVICE

INCO TRADE MARK

MONEL FOR MINIMUM MAINTENANCE

**THE INTERNATIONAL NICKEL COMPANY, INC.**

*67 Wall Street, New York 5, N. Y.*

# KHP

## *Precision* SPRING STEEL

KHP *precision* Spring Steels are available in both annealed and tempered grades, in a carbon range of .50 to 1.00. Choice of finishes in blue, straw, and mirror bright. Thicknesses from .0015 to .125 in tempered, and from .005 to .1875 in annealed. Also Feeler Gauge steels in all thicknesses. To assist you in the most economical application of KHP Spring Steels, the cooperation of our metallurgical department is freely at your service.

*KHP PRODUCTS ARE: Cold rolled and hot rolled strip—shim—sheet steels • Annealed spring steels • Tempered and polished spring steels • Tempered feeler gauge steel • Cold finished bars • Drill rod • Electrical sheets • Precision tubing—cold drawn seamless—welded—stainless and alloy tubing • Aluminum strip and sheets • Extruded aluminum and magnesium tubing—shapes—mouldings • Rolled magnesium plates • KHP SERVICES: Edge rolling • Slitting • Square shearing • Flattening, straightening, cutting.*

KHP STEEL

**KORHUMEL • HEFFRON & PREISS STEEL CO.**

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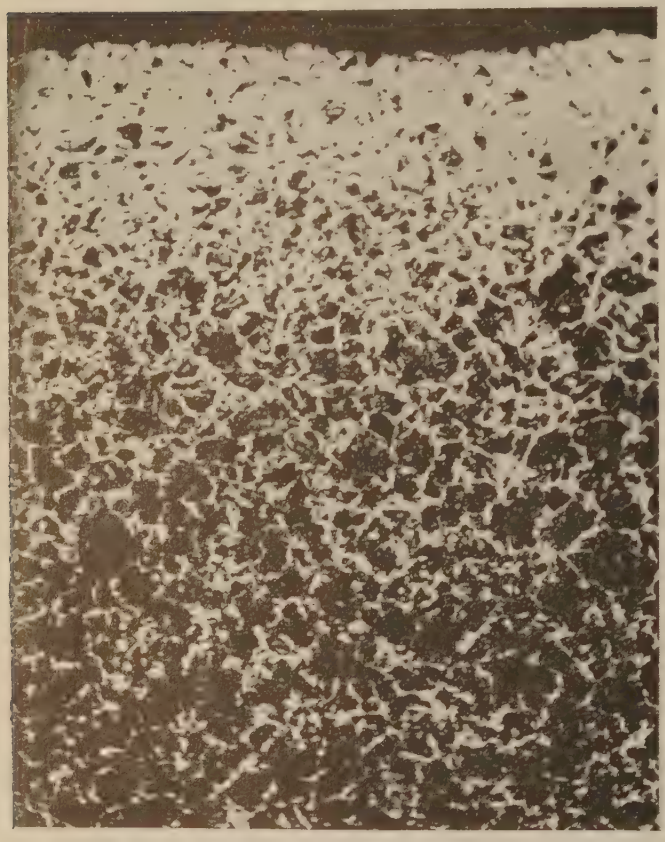
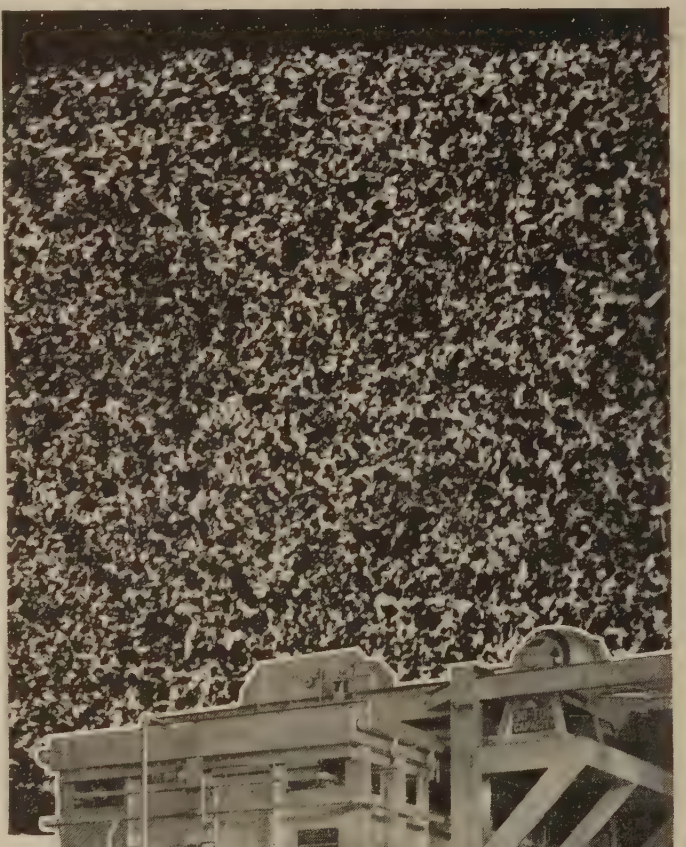
WAREHOUSES: MINNEAPOLIS • MILWAUKEE • MT. VERNON, N.Y. • SALES OFFICES: DETROIT • ST. LOUIS • LOS ANGELES

# Save the Cost of . . . USE REPUBLIC "CARBON

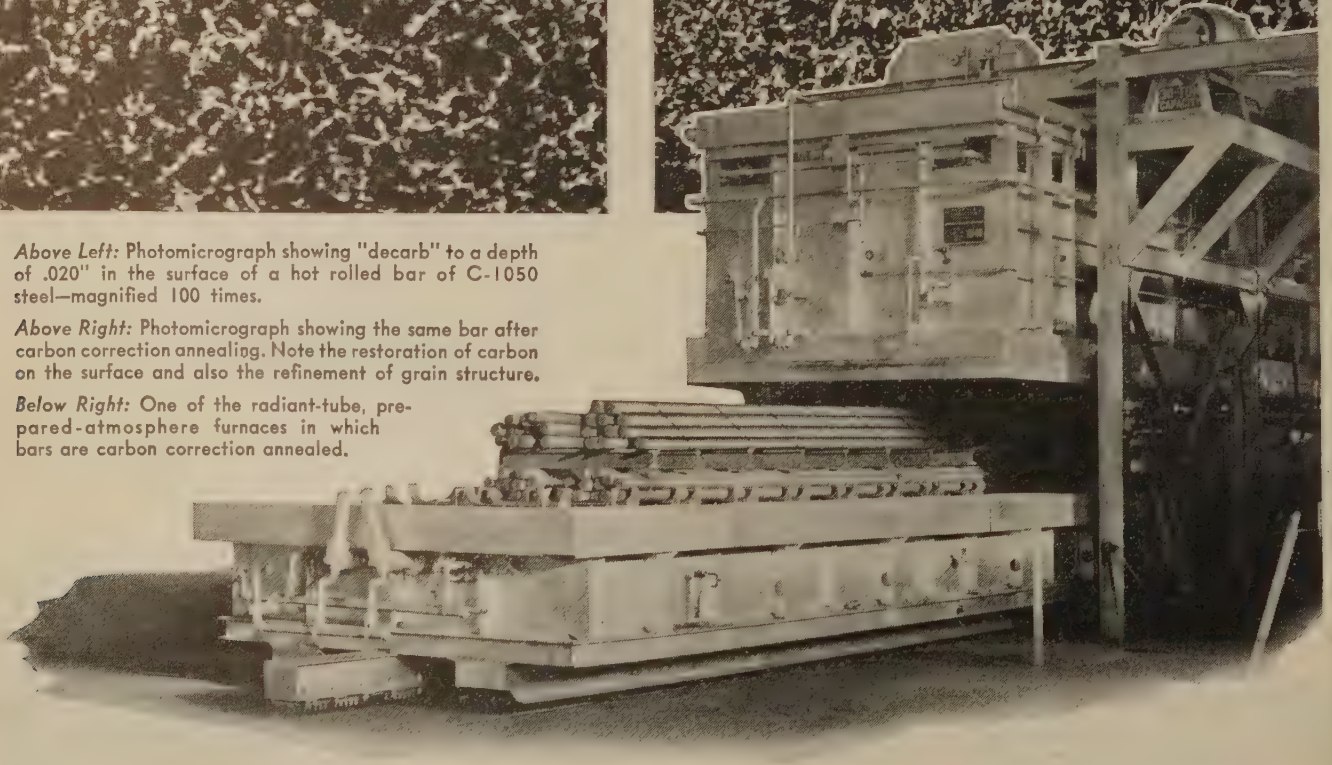




*Above Left:* Photomicrograph showing "decarb" to a depth of .020" in the surface of a hot rolled bar of C-1050 steel—magnified 100 times.

*Above Right:* Photomicrograph showing the same bar after carbon correction annealing. Note the restoration of carbon on the surface and also the refinement of grain structure.

*Below Right:* One of the radiant-tube, prepared-atmosphere furnaces in which bars are carbon correction annealed.



# How to get prompt delivery on LYON METAL PRODUCTS.

● Many LYON Dealers and their customers have found it possible to supply us with steel in 12 to 24 gauge sheets. In such cases, we will buy the steel from you and ship the pound-for-pound equivalent in

***EITHER***

... any selection of LYON standard products (see partial list below) at regular published prices...

***OR***

... assemblies, subassemblies, parts, etc., for your products — to your specifications—in an even wider range of gauges—8 to 30.

*In other words . . .*

## YOU Furnish the Steel

## LYON WILL MAKE THE PRODUCT

For complete details, write or ask your nearest LYON Dealer or LYON District Office.

**LYON METAL PRODUCTS, INCORPORATED**

General Offices: 936 Monroe Ave., Aurora, Illinois
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- Shelving
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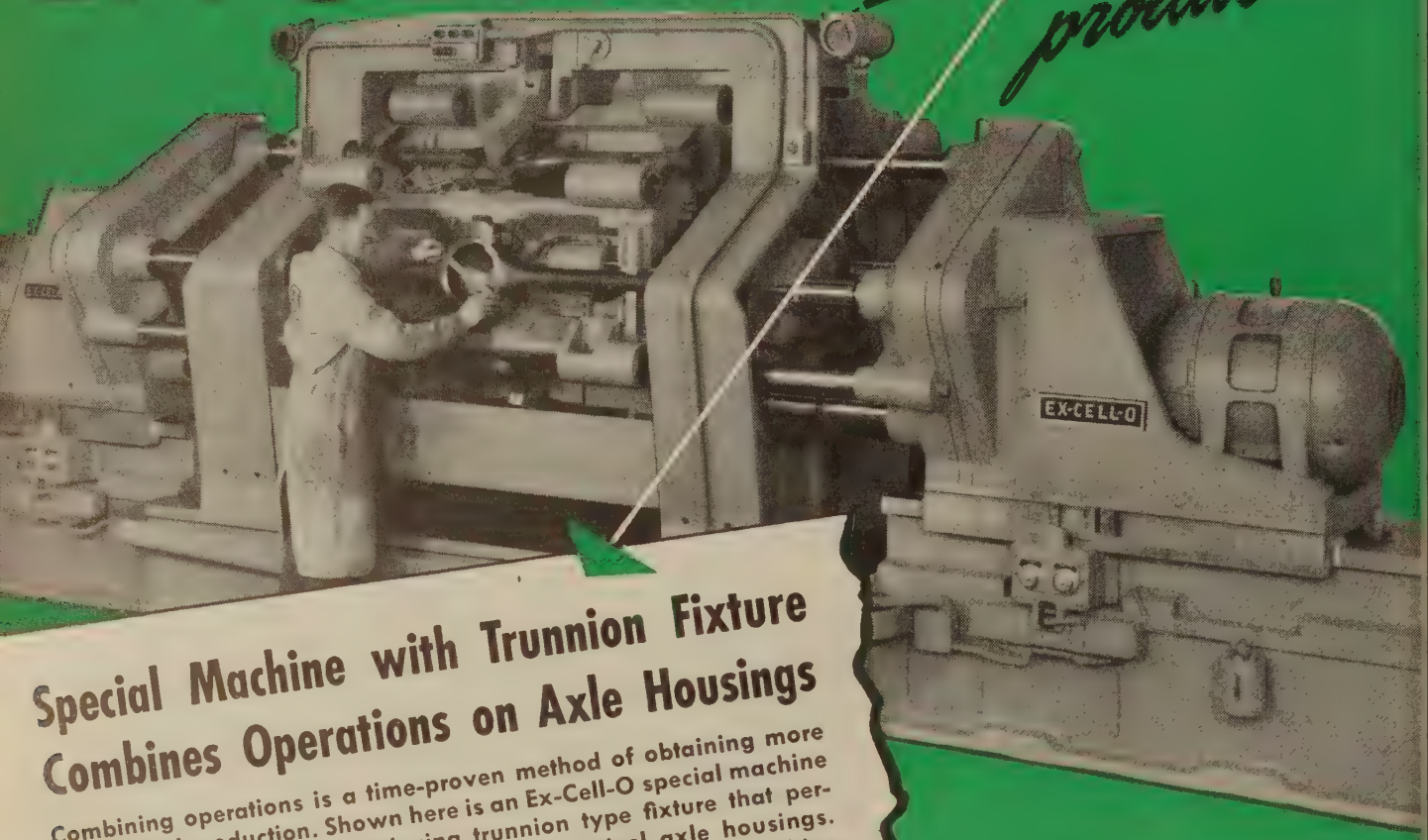
- Wood Working Benches
- Economy Locker Racks
- Kitchen Cabinets
- Display Equipment
- Hanging Cabinets
- Welding Benches
- Filing Cabinets
- Cabinet Benches
- Folding Chairs
- Drawing Tables
- Storage Cabinets
- Bench Drawers
- Work Benches
- Drawer Units
- Conveyors
- Shop Boxes
- Bar Racks
- Bin Units
- Tool Stands
- Service Carts
- Hopper Bins
- Parts Cases
- Flat Drawer Files
- Tool Trays
- Desks
- Stools
- Tool Boxes
- Sorting Files
- Ironing Tables

# EX-CELL-O

*Can give you more economical production*




## Special Machine with Trunnion Fixture Combines Operations on Axle Housings

Combining operations is a time-proven method of obtaining more economical production. Shown here is an Ex-Cell-O special machine with a six-station power indexing trunnion type fixture that performs roughing and finishing operations on steel axle housings. Standard hydraulically-actuated slides at both ends of the machine carry multiple spindle heads and their drive motors. Another slide at the rear supports a precision spindle and a facing head.

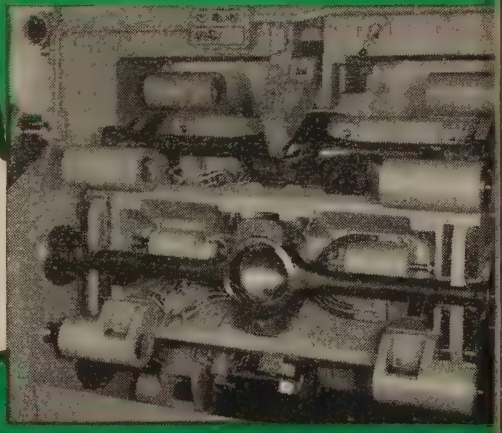
The tool holders in both the multiple spindle heads are rigidly guided by bushings in the fixture end frames. Coolant is manifolded to each station and directed through drilled holes to the point of contact between the tools and the work.

Parts are laid in the loading station and are located and clamped hydraulically. Operations are rough, semi-finish bore and ream bearing diameters at both ends; rough and finish face flanges, chamfer inside and outside edges of flanges and turn O.D. of flanges at both ends; face banjo. All these operations are performed at a net production rate of 55 pieces per hour!

Let Ex-Cell-O help you combine operations for more economical production. A complete staff of experienced machine tool engineers is ready to help you with your production problems. Contact your Ex-Cell-O representative today!

**Above:** Ex-Cell-O special machine performs many operations on steel rear axle housings.

**Below:** Close-up view of the Ex-Cell-O six-station trunnion type fixture which easily handles the large parts.



XLO
EX-CELL-O for PRECISION

# EX-CELL-O CORPORATION

Detroit 32, Michiga

Special Multiple Way-Type Precision Boring Machines • Special Multiple Precision Drilling Machines • Precision Boring, Turning, and Facing Machines and Fixtures • Precision Cylinder Boring Machines • Precision Thread Grinding Machines • Precision Lapping Machines • Precision Broach Sharpening Machines • Other Special Purpose Machines • Tool Grinders • Continental Cutting Tools • Broaches and Broach Fixtures • Counterbore Sets • Grinding Spindles •

# High Temperature Lubrication . . . 400° F. and up!

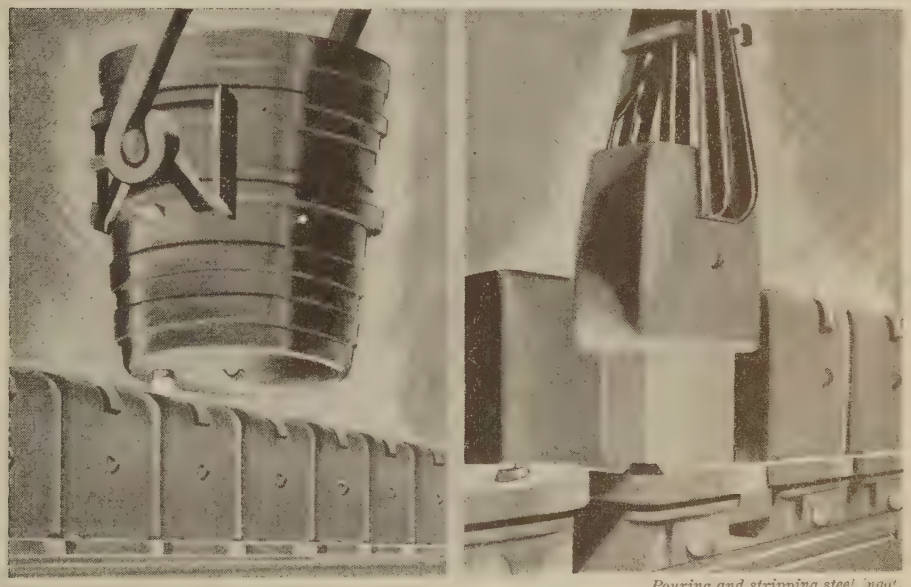
A large Midwestern steel company reports that easily applied "Darmold" Mold Wash—produced with **"dag"** colloidal graphite by the Dacar Chemical Products Company, Pittsburgh—has simplified ingot stripping...lengthened mold life...improved surface quality of ingots...reduced ingot product conditioning costs.

In the steel industry, as in countless other industries, **"dag"** colloidal graphite dispersions are continually conquering problems of high temperature lubrication. Perhaps one of the many **"dag"** colloidal graphite dispersions is the answer to your particular problem.

In addition to high temperature lubrication **"dag"** colloidal graphite dispersions are ideal for use in opaquing, parting, impregnating, general lubrication, and electronics work.

Consult Acheson Colloids engineers for possible money-saving applications of these versatile products in your business. Clip the coupon and mail NOW.

Acheson Colloids Corporation, Port Huron, Michigan; Boston; New York; Philadelphia; Pittsburgh; Cleveland; Detroit; Chicago; St. Louis; Los Angeles; San Francisco; Toronto.



*Pouring and stripping steel ingot.*

**dag** REG. U. S. PAT. OFF. **COLLOIDS**

*Send us information on "dag" colloidal graphite dispersions for:*

Extreme (high or low) temperature lubrication ☐
General lubrication ☐ Parting ☐
Impregnating ☐ Opaquing ☐
Electronic applications ☐

JJ18

*40th Anniversary Year*

## Acheson Colloids Corporation

**Port Huron, Michigan**

THIS TRANSCONTINENTAL RAILROAD BOUGHT

# NINETEEN BROWNINGS

IN THE LAST FOUR YEARS...OVER 100 SINCE 1906

BROWNING
LOCOMOTIVE, WAGON, TRUCK and TU-CONTROL Cranes

THE new Browning M Series Locomotive Cranes are handling all types of heavy maintenance-of-way work for this class 1 railroad.

Bridge and roadway crews call for the Browning Diesels from all points on the transcontinental line—in fact it is hard to locate the Brownings from day to day.

Combining typical Browning ruggedness, long range mobility and easy operation the M Series Diesel has the versatility to handle clamshell, magnet, hookblock, piledriver and crane work on *your* job dependably and economically.

Bulletin No. 114718 describes new Browning features of design, construction and operation. Write for it today.

**THE BROWNING CRANE & SHOVEL CO.**
16221 WATERLOO ROAD, CLEVELAND 10, OHIO

LOBDELL-NAZEL
FORGING HAMMERS
are TIME, LABOR and COST-SAVING

Whether used for commercial forging, maintenance work or mass production, these compact, air-actuated, motor-driven hammers give you 7 distinct advantages.

THEY ARE:

1. Self - contained — require no compressor, accumulator or piping.
2. Consume power only when operating.
3. Provide a powerful, squeezing blow.
4. Positive in action.
5. Simply controlled.
6. Heavy, rigid, durable construction that assures long, trouble-free life.
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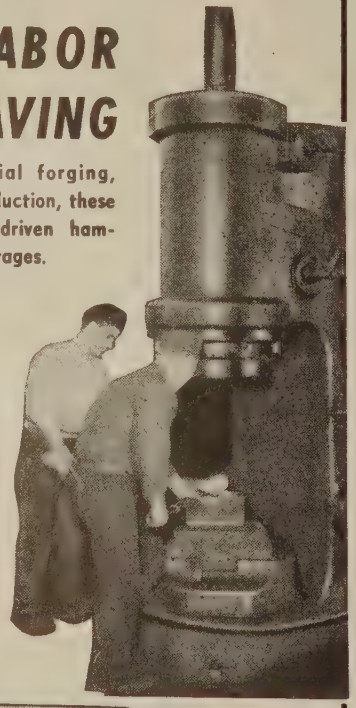

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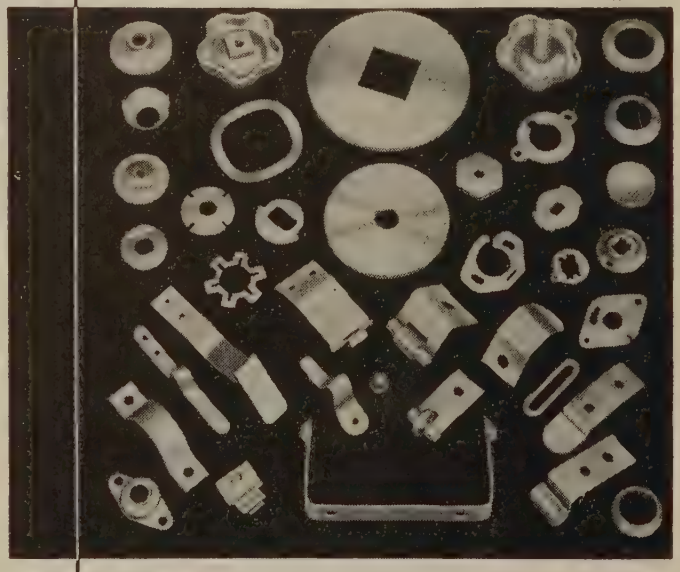

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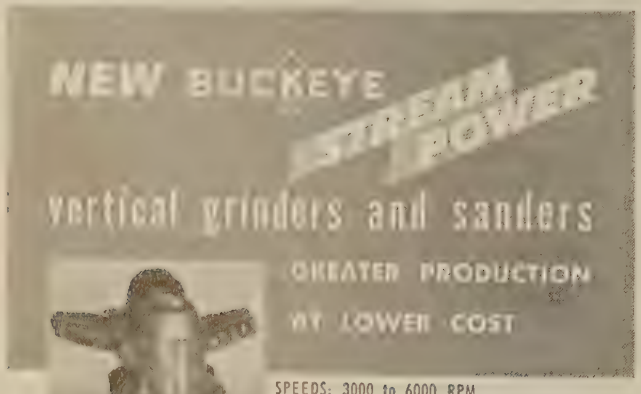

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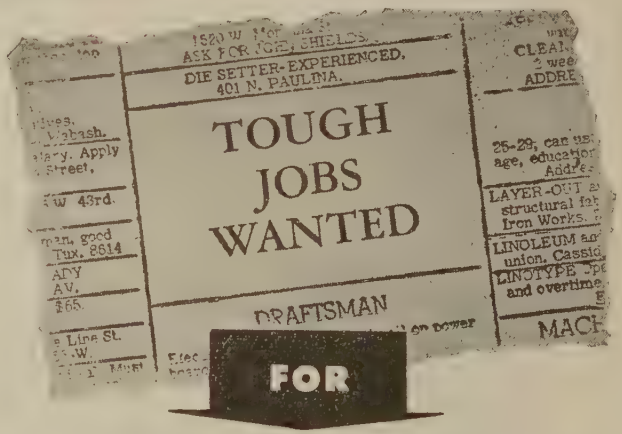


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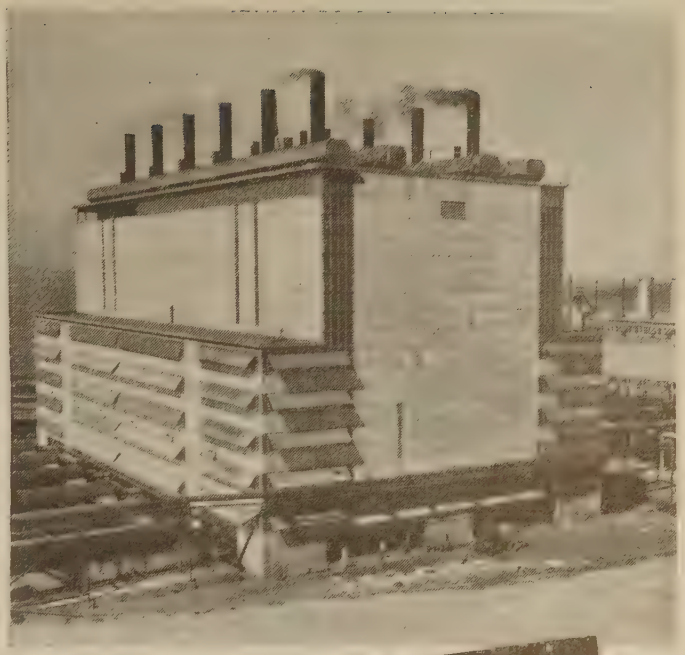

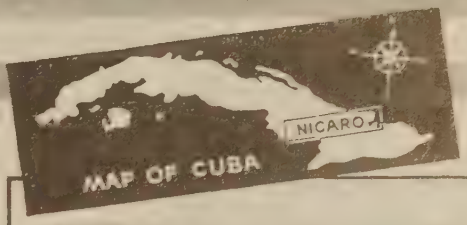


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This property is offered for sale or lease, as a whole, and as presently constituted and located, including:

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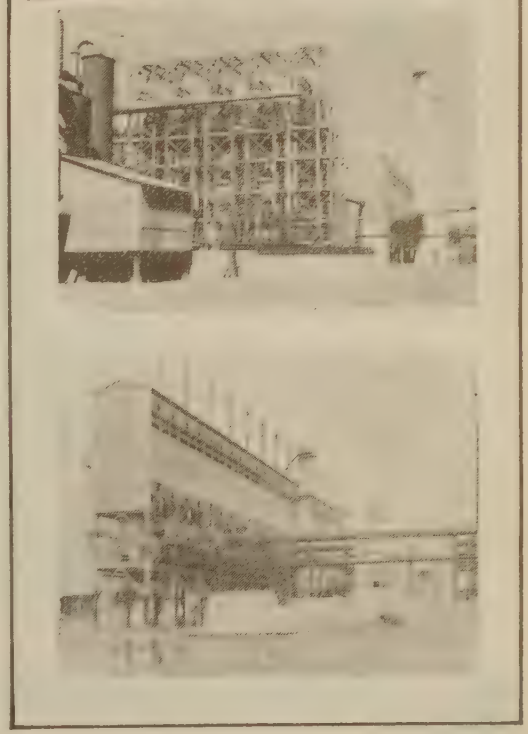
**(c) Complete townsite . . . more than 400 buildings with utilities and services for 3,000 people;**

**(d) Mining rights for 20 years on a royalty basis . . . ore reserves nearly 35 million tons.**

The ore deposits are privately owned by the Nicaro Nickel Company, an American corporation whose preferred stock is owned by the U. S. Government. Either sale or lease will include all the U. S. Government's right to mine on a royalty basis for a period of 20 years. The sale of the plancor will further include all preferred stock in Nicaro Nickel. Transfer of title will be made subject to a national security clause intended to provide for the optimum utility of this plant in a national emergency—a provision which should tend to favor the operator in such an event.

Disposal of this property will be on the basis of sealed bids which will be publicly opened and read at the War Assets Administration, Office of Real Property Disposal, Washington 25, D. C., on December 2, 1948, at 3:00 P.M., E.S.T.

Write to this office at once for bidding instructions and for illustrated brochures describing the plant and townsite with maps, photographs, construction details of all buildings and description of the Nicaro process.



This advertisement is not a basis for negotiation. War Assets Administration reserves the right to consider all proposals in the light of the applicable objectives of the Surplus Property Act and to reject any or all bids.

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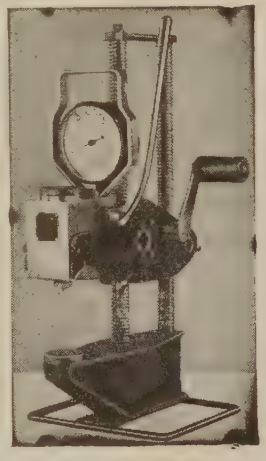

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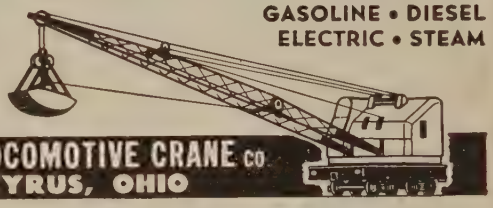

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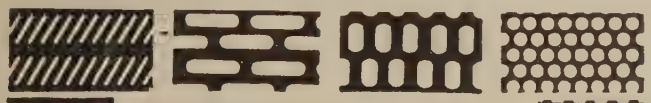

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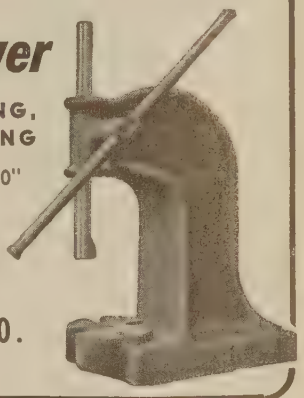

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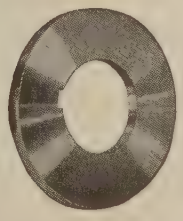

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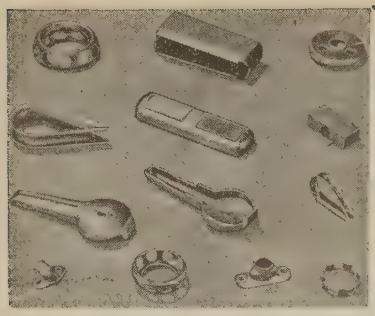

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2 Ton Heroult Nose Tilt Type Melting Furnace
3 Ton Heroult Rocker Tilt Type Melting Furnace
Lee Wilson Rotary Hearth Heat Treating Furnace Oil Fired for forging, forming, heat treating, etc. Rotary 11' Dia.
500# Electric Furnace Co. Tilting Type Rotary Gas Furnace. Complete with Accessories

### GEAR HOBBING MACHINES
No. 5B Sykes Gear Generator, Motor Driven, Will cut a gear from 3" to 61" dia. by 48" wide on spur and 21" on Herringbone. New 1945

### GEAR REDUCERS
600 H.P. Westinghouse Reduction Unit Ratio 3.76-1 With 600 H.P. Westinghouse A.C. Motor
500 H.P. Mesta Double Reduction Ratio 11:1
800 H.P. Falk Single Herringbone Gear Reducer, 366/40 RPM
1000 H.P. Falk Double Reduction Ratio 29:1

### GENERATOR SET
500 KVA Elliott Co. Generator 2400 volt 3 ph. 60 cy. Powered by Sterling-Viking Diesel Engine 8-Cylinder, rated 650 H.P. Complete united mounted on trailer for portable use. Is equal to new condition—little used.

### GRINDER—CYLINDRICAL
Cincinnati Filmatic Plain Self-Contained Grinder 30x3x20 Grinding Wheel, Motor Driven with 6 Motors

### HAMMERS—BOARD DROP
1000# Billings & Spencer Model D
2000# Chambersburg Model F
2500# Erie

### HAMMERS—STEAM DROP
1000 lb. Chambersburg
1000 lb. Erie
1500 lb. Erie
2000 lb. Chambersburg
2500 lb Erie

### HAMMERS—STEAM FORGING
200, 400, 500,
1000, 1250#, 1500#, 4000# Chambersburg
900, 1000, 1100, 1250, Niles-Bement-Pond
4500# Bement Miles Double Frame
2500# Single Frame Niles-Bement-Pond
6000# Chambersburg Double Frame
20,000# Arch Type

### HAMMERS—MISCELLANEOUS
1000# Chambersburg Pneumatic Motor Driven Forging Hammer, Complete with Motor
48" x 48" Chambersburg CecoStamp Hammer
48" x 66" Chambersburg CecoStamp Hammer
48" x 36" Chambersburg CecoStamp Hammer
30" x 24" Chambersburg CecoStamp Hammer

### LEVELLER—ROLLER
48" Roller Leveler, Motor Driven, 17 Rolls 5¼" Dia.

### NIBBLER
No. 10-B Gray Turret Head Metal Nibbler Motor Driven. 36" Throat. Capacity mild steel 9/16". Complete with Circle Cutting Attachment

### PLANER—PLATE EDGE
30' Wm. Sellers & Co. Plate Edge Planer, M.D.

### PRESSES—HYDRAULIC
75 Ton HPM Fastraverse Hydraulic Press 90" Maximum Travel, 30" x 30" Bed Area. Used on 24" Stroke
100 ton "C"-Frame Hydraulic Press, 10¼" Stroke, 16" x 28" Slide Area
200 ton Speed Hy-Matic Hydraulic Press, 36" Stroke, 36" Between Uprights
250 ton HPM Fastraverse Hydraulic Press, 12" Stroke, 37" Between Uprights
300 ton Baldwin Southwark Hydr. Press, 25" Stroke, 36½" x 36½" Bed Area
300 ton HPM Hydraulic Press, Complete with Pump & Motor. Bed Area 30" x 36", Stroke 18", Daylight 24"
375 Ton Elmes 4-Column Drawn Press, Complete with Motors and Controls. 66" x 84" Bed Area, 36" Total Ram Stroke
600 ton Hydraulic Extrusion Press, 35½" Stroke, 29" x 26" Platen Size
700 Ton Robertson Hydraulic Extrusion Press, Complete with Pump & Motor
750 ton Lake Erie Double Acting Hydraulic Press, Platen 146" x 81½", Stroke 46"
1000 ton Chambersburg 4-Column Hydraulic Press, 18" Stroke, 48" x 22" Between Columns
1000 Ton United Steam Hydraulic Forging Press
1500 ton Wood Hydraulic Press, Complete with Pump & 75 H.P. Motor, 12" stroke, 48" x 48" Bed Area
2000 ton Wood Hydraulic Press, 9" Stroke, 24" x 35" Bed Area

### STRAIGHTENERS
No. 6 Kane & Roach Straightener. Capacity Angles 5 x 5 x ⅝". Rounds & Squares 2⅜". Flats 6 x 1"
No. 5 Kane & Roach Straightener. Capacity Angles 4 x 4 x ½". Rounds & Squares 2½". Flats 3½ x 1"
⅝" Wells Straightening & Cut-Off Machine 20' Cut-Off, Motor Driven
¾" Wells Straightening & Cut-Off Machine. 24' Cut-Off, Arr. Motor Drive
No. 2B Kane & Roach 13-Roll Straightener

### PRESS—HYDRAULIC WHEEL
150 ton Caldwell Hydraulic Wheel Press Motor Driven. 38" Between Parallel Bars

### PRESS—KNUCKLE JOINT
No. K-1200-30 Clearing Knuckle Joint Press 200 Ton Capacity 4" Stroke, 31" Between Uprights

### PRESSES—STRAIGHT SIDE
#87 Bliss Reducing Press, V-Belt Motor Drive 16" Stroke, 26" Between Uprights
#16 Waterbury-Farrel 255 Ton, 6" Stroke, 35" Between Uprights
No. 76½ Bliss Press 215 Ton, 4" Stroke, 27" Between Uprights
#168¾ Toledo 350 Ton, 8" Stroke, 40" Between Uprights
#83 Bliss Straight Side Reducing Presses (7) Strokes 8" to 13" (NEW)
#78½ Bliss Single Crank Press, 400 Ton, 10" Stroke, 36" Between Uprights
#D201 Ferracute Single Crank Press, 6" Stroke, 32" Between Uprights

### PRESSES—TRIMMING
#8 Erie Trimming Press, 8¾" Stroke 22" x 20" Bed Area, 3" Stroke of Side Shear

### PUMP—VERTICAL TRIPLEX
2⅜" x 8" Aldrich Vertical Triplex Pump Capacity 37 GPM at 1500 lbs. Pressure

### PUNCH—HORIZONTAL
No. 1 Hilles & Jones Horizontal Punch, Capacity ⅞" thru ¾"

### PUNCH & SHEAR COMBINATIONS
Style G Cleveland & Punch & Shear Single End 60" Throat, Capacity Punch 2" thru 1" plate
Style EF Cleveland Double End Bar & Angle Shear Motor Driven, Completely Equipped. NEW 1947
Style EF Cleveland single end arranged for geared Motor Drive, 72" Throat Capacity Punch 1¼" thru 1"
No. 48 Buffalo Armor Plate Single End Punch & Shear, Direct Motor Drive. Capacity Punch 1⅜" x 1", Shear 2" Rd. 1¾" Sq.
No. 2 Long & Allstatter Double End Throats 60" and 42", Capacity Punch 1" thru 1"

### PUNCH—MULTIPLE
Size G Long & Allstatter Multiple Punch, Motor Driven 8'6" Between Housings, Complete with Spacing Table Automatic Spacing Indicator & Automatic Table Adjustment.

### RIVETERS
Chambersburg Engr. Co. Hydraulic Riveter 10'6". Standard Riveting Attachments
125 ton Hanna Bull Riveter, 75" Reach, 24" Gap, Capacity 1" Rivet Cold & 1½" Hot

### ROLLING MILLS
8 x 4½" McWilliams Single Stand Two High
16½ x 30 Mesta Single Stand Two High
18" x 30" Farrel Two Stand Two High
20½" x 30 Mesta Four Stand Two High
20 x 60" Three Stand Two High
24"x60" Two Stand Two High
9" Two High Hot Mill for rolling strip steel

### ROLLS—PLATE STRAIGHTENING
98" Hilles & Jones Plate Straightening Roll 6 Rolls 11" Dia. Capacity 1" Plate
No. 4 Hilles & Jones Plate Straightening Roll, Motor Driven, 6 Rolls 14" Dia. x 10'4" Wide. Capacity 1" Mild Steel

### ROLLS—TAPER FORGING
#1 Ajax Taper Forging Roll, Motor Drive
#5 Ajax Taper Forging Roll, Motor Drive

### SAWS
Z-36 Do-All Zephyr Saw, Motor Driven—36" Throat, 36" Work Table—New 1947
42" Newton Type U-82-A Heavy Duty High Speed Cold Saw, Completely Hydraulic, Elecl. Equipment Included. Capacity 16" Round or Square with 48" Blade
AVEY Band Saw, Motor Driven Capacity 6" Round or Square

### SHEARS—ALLIGATOR
No. 1½ Doelger & Kirsten Alligator Shear Motor Driven. Capacity 2" Round
No. 2 Doelger & Kirsten Alligator Shear Motor Driven. Capacity 3" Round
No. 3 Doelger & Kirsten Alligator Shear, Motor Driven. Capacity 4" Round, 3½" Square

### SHEAR—BAR
No. 1 Long & Allstatter Bar Shear, Motor Driven. Capacity 2" Round, 1¾" Square
No. 1 Pawtucket Bar Shear, Motor Driven, Capacity 1½" Round

### SHEAR—BILLET
No. 6 Mesta Billet Shear, Motor Driven, Capacity 6" x 6" Square Billets
United Engry & Fdry. Co. Billet Shear, Motor Driven 26" Throat, Capacity 4½" x 4½" Cold

### SHEARS—GATE
8' x 1" Cincinnati Gate Shear, Motor Dr.
9' x ¾" Bertsch Gate Shear, Arr. M.D.
120" Morgan Gate Shear, Motor Driven. Hydraulic Holddowns. Complete with pump and motor. Capacity 1½" Mild Steel

### SHEARS—ROTARY
Quickwork Rotary Shear, Motor Driven. Complete with Circle Cutting Attachment, Capacity 5/16"
No. 250 Kling Rotary Shear, Arr. Motor Drive, 36" Throat Capacity ¼" Plate
No. 500 Kling Rotary Shear, Motor Driven. Capacity ½". Complete with circle cutting, flanging and joggling attachments

### SHEARS—SQUARING
13' x ⅜" Dreis & Krump All Steel
10' x ⅛" Niagara Overdriven Shear
No. 1010 Cincinnati Power Squaring Shear, Capacity #10 Gauge, Arr. V-Belt Drive

### SLITTER
Yoder GH-36 Gang Slitting & Leveling Machine. Capacity 4 cuts ⅜" to 13 cuts 3/16". 8 Leveling Rolls 44" x 5" Dia. Motor Drive.
30" Torrington Slitter, Arr. Motor Drive. Capacity 4 cuts .400" Gauge 30" wide

### STRAIGHTENERS
⅜" Shuster Straightening & Cut-Off Machine, Motor Drive. With 16' Cut-Off
No. 4 Medart Straightening Machine Arranged for Motor Drive. Capacity 2½" to 6" Incl. Round Bars
No. 4 Sutton Straightening Machine, Motor Drive Capacity 2" to 6" Round, Timken equipped
Kane & Roach Rotary Straightener, Capacity ½" O.D. and smaller

### SWAGING MACHINES
#412 Etna Machine Co. Rotary Swager, Arr. M.D.—Capacity Tubing 4", Die Length 18"—New 1945
No. 8HS Langelier Swaging Machine, M.D., Capacity 6½" Tubes, 4½" Solids, Hot

### TESTING MACHINES
60,000# Riehle Universal Hydraulic
200,000# Riehle Universal
200,000# Elmes Compression Testing Machine, Hydraulic Type
800,000# Hydraulic Chain Testing Machine

### TUMBLING BARRELS
48" x 72" W W Sly Tumbling Barrel, M.D. New 1942
30" x 54" W W Sly Tumbling—NEW
30" x 48" W W Sly Tumbling Barrel

### WELDER
Union Melt Type "U" Model CM21 Welder 1000 Amp. Transformer. Capacity up to ¾" in stainless steel

### WIRE MACHINERY
#33 U.S. Tool Co. Multislide Machine with Press Attachment and Pay-Off Reels
7-Wire Shuster Stranding Machine
7-Wire Syncro Stranding Machine
Fidelity Wire Spooling Machine Single Head
Wire Spooling Machine, 10-Head, 6" Spools
No. 8 Vaughn Wire Drawing Machine, 16" Dia. Blocks (6), Belt Driven. Starting sizes #2 to #5, Finish #4 to #8
No. 10 Vaughn Single Deck Motoblocs Motor Driven.

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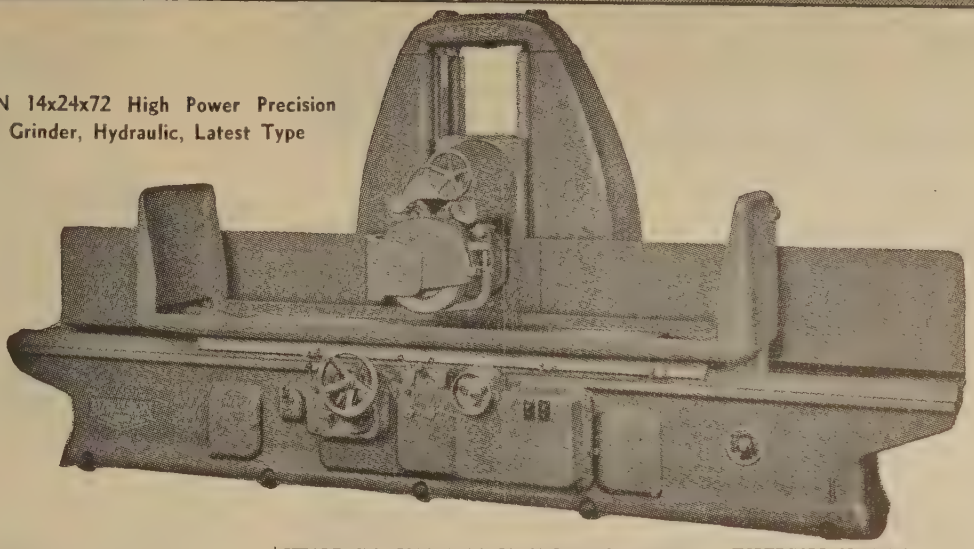
# LATEST TYPE NEARLY NEW MACHINES



MATTISON 14x24x72 High Power Precision Surface Grinder, Hydraulic, Latest Type

## AUTOMATIC SCREW MACHINES
BROWN & SHARPE #2G High Speed latest type
BROWN & SHARPE #4 1¼" Cap. High Speed Latest
GOSS & DeLEEUW 8" Auto. Chucker, 5 spindles, latest

## BORING MILLS—Horizontal
CINCINNATI-GILBERT 3½" Bar Floor Type, Latest
DETRICK & HARVEY 4" bar, Floor Type, M.D.
GIDDINGS & LEWIS #25, 2¼" bar, M.D.
LANDIS #35, 3½" bar; Floor Type
LUCAS 41, 3" bar, Latest Type
NILES BEMENT POND 5", 6" bar, floor type
UNIVERSAL 3" bar, high speed, latest type
UNIVERSAL 3A 3" Bar Motor Drive

## BORING MILLS—Vertical
BETTS 120", 2 swivel heads, AC, M.D.
BULLARD 16" 6-spindle Type D Mult-Au-Matics
BULLARD 16" 8 spdle, Type D, Mult-Au-Matic
BULLARD 36" Vert. Turret, Side head M.D.
KING 52", 62", 2 swivel heads, PRT, motor drive
NILES 38-44" Cert. Turret, Side Head. M.D.
NILES 100" heavy duty 10½' height under toolholders, 2 swivel heads, motor drive
NILES 84" Heavy Duty 2 swivel heads, PRT, M.D.
NILES 100" Heavy Duty, 2 swivel heads, PRT, M.D.

## BROACHES
CINCINNATI 1-30 Duplex, Vertical, Surface, Double Ram, Model ER, Hyd., Latest
CINCINNATI 3-30 Duplex, Vertical, Surface Double Ram, Model ER, Hyd., Latest

## DEEP HOLE DRILLS
LeBLOND #2 Single Spindle, Hydraulic, Latest Type
PRATT & WHITNEY 1½Bx30, 1½Bx50 2 spindle, Latest Type

## GEAR CUTTING EQUIPMENT
BARBER COLMAN Type A Hobber, Latest Type
BROWN & SHARPE No. 3H gear cutter, M.D.
FELLOWS Model Z Gear Shaper, High Speed, Latest
FELLOWS #615A, #61, #7A, #72, #7, #75, #725, #61A, #77 High Speed Gear Shapers; latest
FELLOWS #12M Involute Measuring Instrs. Latest
FELLOWS #6Z2 Gear Shaper; high speed; latest type
FELLOWS #13LS Lapper, latest type
GLEASON 3" Straight Bevel Generator, Latest Type
GLEASON 12", straight bevel generator, Latest Type
GLEASON #17 Hypoid Spiral Bevel Zerol, Latest
GLEASON #20 Spur Gear Tester, latest type
GLEASON #4, #6, #18 Bevel and Hypoid Tester
GOULD & EBERHARDT 12HS hobber, Latest Type
GOULD & EBERHARDT 36H Hobber with Diff., M.D.
PRATT & WHITNEY 10" Grinder, hyd., latest

## GRINDERS—Cyl.—Plain & Univ.
BROWN & SHARPE #1, 2, 3, Universal, Latest
BROWN & SHARPE #5 Plain, 3 x 12, Latest Type
BROWN & SHARPE #20 10x18 plain, latest type
CINCINNATI 6" x 18" Plain, Model EA, Hyd., latest
LANDIS 4x12, 4x18, Type H, Plain, Hyd., latest
LANDIS 10x24 Universal Type C, Hydraulic, Latest
NORTON 6 x 18 Type C Plain Hydraulic, Latest
NORTON 10x36 Type C Plain Hydraulic Latest

## GRINDERS—Miscellaneous
BRYANT #5, #16-16, #16-CP-16, #24, Internal Hydraulic, latest type
CINCINNATI Centerless Lapper—Model E.D.—Latest
CINCINNATI #2 Centerless "FILMATIC"—Latest
CINCINNATI #3 Centerless "Filmatic" latest
CINCINNATI #2 Plain Cutter & Tool; latest type
COVELL #22 Universal Tool & Cutter latest
FITCHBURG 14"x25" Spline hydraulic latest
HEALD 75A, 72A3, 72A5, 74, 81 Internal; latest type
JONES & LAMSON 6x15, 8x48, Thread Grinder, latest
PRATT & WHITNEY Contour Cutter, Latest
THOMPSON 6"x48" Auto., round broach. M.D.

## GRINDERS—Surface
ARTER 8" Auto. Piston Ring, M.D.
BLANCHARD #16, 24" chuck, M.D.
BLANCHARD No. 16A—Dial Type—M.D.
BLANCHARD #11 Vert. 16" Mag. Chuck, Latest
DO-ALL 8x24 Hydraulic Latest Type
HEALD #22 Rotary, 12" chuck, latest type
HEALD 25A Rotary, 16" & 30" chuck, Latest
MATTISON 14x16x60 hydraulic, latest type
NORTON 6x18 Hydraulic; latest type
THOMPSON 16x30x48 hydraulic, latest type

## JIG BORERS
PRATT & WHITNEY #1A Motor Drive
PRATT & WHITNEY #3B Model 4854, Latest Type
REED PRENTICE #5 Die Sinker, Latest
VERNON Precision M.D., Latest

## LATHES—Engine and Mfg.
AMERICAN 18 x 72" centers, Geared, M.D.
AMERICAN 36 x 360" centers, 2 Car., Geared, M.D.
BRIDGEFORD 36"x32' bed—2 carriages M.D.
JONES & LAMSON "Fay" 20x25" automatic, latest
LeBLOND 25 x 96" centers, Geared, Motor Drive
LEHMANN 16x30" centers, TIMKEN, latest type
LODGE & SHIPLEY 18x72 centers, M.D.
LoSWING 4x60, 4x84, 8x60, 8x108, 5x34, Latest
MONARCH 12x30" centers; Timken; latest type
MONARCH 12" x 54" centers, Model C, Timken, Latest
MONARCH 16x28" geared-head, M.D.
MONARCH 10" 20" centers, Model EE, Timken, latest
MOREY Model A 8"x120" shaft turner, Latest Type
NILES 42"x60" double head, motor drive
NILES 72"x62' centers, comb. Boring Turning
NILES 30x50' Boring, Timken, Latest Type
NILES 48x87' centers, comb. boring and turning, M.D.
NILES 90"x110" Centers Car Wheel, M.D.
PRATT & WHITNEY 10"x20" centers Bench, latest
REED PRENTICE 16x24" centers, geared head, M.D.
SEBASTIAN 16"x36" centers, Timken, Latest Type
SPRINGFIELD 14"x6' bed, geared head, M.D.
SPRINGFIELD 16"x6' bed, geared head, M.D.
SPRINGFIELD 16"x30" centers Timken, latest type
WARD, HAGGAS & SMITH—18/30x66" centers gap, motor drive, Latest Type

## LATHES—Turret
BARDONS & OLIVER #5, #7, TIMKEN, Latest Type
CINCINNATI ACME No. 1 Timken, Latest
FOSTER #4FU "Fastermatic," Timken, latest
GISHOLT #1L, #2L, Universal, Timken, Latest
GISHOLT #3, #4 Univ. Bar, Latest Type
JONES & LAMSON #3 Univ. Bar and Chuck, Latest
JONES & LAMSON #5 Univ. Bar and Chuck, Latest
JONES & LAMSON #8A Univ. Bar and Chuck, Latest
LIBBY No. 1H-5 Timken Bearing—latest—5½" hole
MOREY No. 2G, No. 3, No. 4, Timken Bearing, latest
POTTER & JOHNSTON 5D2E, Auto., Timken, latest
POTTER & JOHNSTON #5D Auto. Timken, latest
WARNER & SWASEY 5, Universal, Timken Bearing
WARNER & SWASEY 1A Univ. Chucking, Latest
WARNER & SWASEY #2A Univ. Bar & Chucker, with or without preselector head, latest
WARNER & SWASEY #1A, #3A Univ. M.D.

## MILLING MACHINES—Mfg.
CINCINNATI 24", duplex, TIMKEN, M.D.
HALL Style D, Planetary latest type
INGERSOLL 42"x38"x12' adj. rail, 4 heads, A.C., M.D.
INGERSOLL 32x24x16' Planer Type, 2 heads, AC. M.D.
INGERSOLL 32x30x12' adj. rail slab, M.D.
SUNDSTRAND #3A Duplex 42" feed, Latest
TAYLOR & FENN M80 Duplex Spline, latest

## MILLING MACHINES—Plain
BRIGGS Type A 12" & 18" Feed Latest Type
BROWN & SHARPE #2 Light Type Timken Latest
BROWN & SHARPE #3B Timken, Latest
BROWN & SHARPE #12 24" Feed Latest Type
CINCINNATI 56-90 Simplex Hydromatic Timken Latest
CINCINNATI 0-8 Automatic rise and fall latest
CINCINNATI 1-12, 2-18, Auto. Timken Latest Type
CINCINNATI 4-48, Hydromatic, 4 spindle with following attachment Latest Type
CINCINNATI #3, 4, 5, Motor Drive
CINCINNATI 4-36 hydromatic, Latest Type
KEARNEY & TRECKER 1218, TIMKEN, latest
KEARNEY & TRECKER #2H Plain Timken Latest
KEARNEY & TRECKER #3, 4, Heavy, Timken, M.D.
KEMPSMITH #4 Maximiller, Timken, latest type

## MILLING MACHINES—Thread
HANSON & WHITNEY 4"x9", Latest Type
LEES BRADNER 12x24 Model HT, latest type
MOREY 12x30, 60, 120, 190, Latest Type

## MILLING MACHINES—Vertical
CINCINNATI #2, #3, #4 Dial Type; Timken; latest
CINCINNATI #08, TIMKEN, Latest Type
CINCINNATI #3, #4 High-Powered, M.D.
GORTON 9J Hand Feed, Latest Type
KEARNEY & TRECKER #2H Timken, Latest
MOREY 12M 2-spindle Profiler, Latest
REED PRENTICE #5 die sinker, latest type
REED PRENTICE 3VG, with or without Hyd. Duplicator, Timken Bearing, Latest Type
SUNDSTRAND #3A, rotary, Latest Type
SUNDSTRAND #3 Profile and Channel, Latest

## PLANERS
CHANDLER 36x36x20', 4 heads, AC, M.D.
CLEVELAND 48 x 60" x 20' Openside; 3 heads; M.D.
DETRICK & HARVEY 48x48x16' 4 heads, Hyd.
GRAY 36"x36"x8'—2 heads, Max. service, D. C. variable, Speed Motor Drive.
LIBERTY 24x24x8' Vari-Voltage, Latest Type
NILES 54" x 54" x 18' 4 heads, Box Table, M.D.
NILES BEMENT POND 48x48x16', 2 heads, AC, M.D.

## PRESSES
BIRDSBORO 325 ton, vert. hyd., Latest Type
CHAMBERSBURG 50 ton, vert. hydro-pneumatic
CLEARING Type DS-1125-32 dbl. action 125 ton. Latest Type.
FERRACUTE #DG-55, 75 ton drawing Latest Type
HPM 37 Ton Vertical Hydraulic Latest Type
LAKE ERIE 500 Ton, Vertical Hydraulic, Latest Type
WATSON & STILLMAN 20 ton hyd. sgt., latest

## MISCELLANEOUS
AJAX 1¼", 3½", Upsetter and Forger, Motor Drive
BARNES #172, 306H, 307 Vertical Hone, Latest
BILLINGS & SPENCER 1500 lb. Board Drop Hammer
CAMPBELL 401 Abrasive cut-off Saw, Latest
CLEVELAND 12"x16' centers—Cutter Reliever, M.D.
GROB #0S20 Saw and Filer, Latest
MICHIGAN #1708 Cutter, Reliever, Latest
NAZEL #4B Pneumatic Hammer, M.D.
PRATT & WHITNEY ½Bx50" Rifler Latest
PRATT & WHITNEY (KELLER) Type BL-2416 Copying, latest type, 2 & 3 Dimensional
PRATT & WHITNEY (KELLER) Type G Copying, latest type 2 Dimensional
QUICKWORK #6 Rotary Shear 1" Cap. M.D.
TANNEWITZ GH-36 Band Saw, latest type

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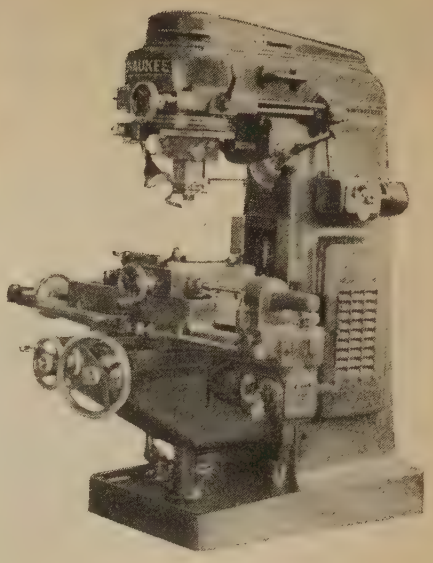
# MODERN
## *used and rebuilt*
# MACHINE TOOLS



**MODEL 2D MILWAUKEE ROTARY HEAD MILLING MACHINE, with power feed to table and spindle, power operated rotary table, universal milling attachment, dividing head, swivel base vise, motor and control. New 1945.**

### AUTOMATICS

9/16″ and 1″ RA-6 Acme-Gridley. New 1943.
1⅝″ 6 Spindle Greenlee. New 1942.
**★2½″ Cleveland Screw Machine. New 1944.**
6″ 4 Spindle Conomatic. New 1942.
6″ Goss and DeLeeuw Chucking Machine—eight spindle. New 1943.
**★Bullard Multaumatic, six spindle model D, single index. Late Model.**

### BORING MILLS

**★Universal No. 40 Tri-Way, 4″ bar, with facing head rotary table, boring bar, motor and control.**
Heald No. 49 "Bore-Matic," three spindles each end. New 1942.
Heald No. 47A "Bore-Matic."
Excello Model 2112A, single end. New 1943.

### BROACHES

No. CPC 6-30 LaPointe Hydraulic Vertical. New 1941.
LaPointe Universal Broach Grinder.

### DRILLS

6′ Carlton Radial, 17″ column.
4′ 11″ Carlton Radial. New 1942.
3′ Cincinnati Bickford Radial. 9″ column. New 1943.
3′ Dreses Radial, 11″ column enclosed head, motor on arm, 1938 model.
20″ Pfeffner Jack Knife Radial.
24″ Sibley Sliding Head.
25″ Fosdick Economax. Late model.
No. H3 Barnes Hydram, 8 speed. New 1942.
36 HO Baker. New 1942.
KH 2 Allen, 6 spindle. New 1943.
No. 2B-8 Edlund Single Spindle. New 1942.
**★No. 2 MS Allen, one to three spindle, four speed motor on each spindle, 15″ overhang, extra large tables.**
Demco 3 spindle Drill.
Hamilton-Muehlmat Drill.
Fox Multiple Spindle. New, 1942.
No. 3 Bausch Multiple Spindle.
Barnes Horizontal Deep Hole, two spindle.

### GEAR CUTTERS

**★No. 5 AC Lees Bradner Gear Generator. New 1941.**
No. 7A & 715A Fellows Gear Shaper.
No. 615A Fellows Gear Shaper.
Red Ring Gear Shaper, Model G.C.L.
No. 12 Barber Colman Hobber
Model S Barber Colman Hobber.
Barber Colman Hob and Cutter Grinder.

### GRINDERS

No. TG 615 Jones & Lamson Thread. New 1943.
No. 2 Cincinnati Centerless. Filmatic. New 1942.
**★No. 2 Cincinnati Universal Tool & Cutter complete. New 1942.**
No. 44, 48, & 49 Excello Carbide Tool. New 1942.
No. 4T Sellers Tool.
No. 22 Covel Universal Tool & Cutter. New 1943.
No. 13 Brown & Sharpe Universal and Tool.
No. 3 Brown & Sharpe Universal.
10″ x 24″ Landis Universal. New 1942.
14″ x 36″ Norton Universal.
6″ x 18″ Cincinnati, Filmatic Bearing.
6″ x 18″ Norton Type "C." New 1942.
6″ x 18″ Landis Type "C" Plain Hydraulic.
10″ x 48″ Norton Type "C."
10″ x 24″ Landis Type "C" Universal. New 1942.
No. 22 Heald Rotary Surface. New 1943.
10″ x 36″ Landis Type "C" Plain Hydraulic. New 1942.
No. 25A Heald Rotary Surface. New 1942.
16″ x 16″ x 48″ Thompson Model C.
3B Abrasive, with chuck. New 1943.
No. 15 Gallmeyer Livingstone Surface.
6″ x 12″ x 18″ Thompson Surface. New 1942.
No. 2B Reid Surface, for wet grinding.
No. 16CP16 Bryant Hydraulic Internal. New 1942.
No. 104 Rivett Internal.
No. 75A Heald Internal. New 1943.
No. 72A3 and 72A5 Heald Internal. New 1943.
No. 74 Heald Extended Bridge Type Internal.

### LATHES, ENGINE

Hendey 14″ x 6′, g.h.
Reed Prentice, 14′ x 30″, g.h.
Reed Prentice, 14″ x 78″, Toolroom. New 1943.
Reed Prentice, 14″ x 54″. New 1943.
Bradford 18″ x 48″, g.h. New 1942.
Sidney 18″ x 54″. New 1943.
Lodge & Shipley 18″ x 54″, g.h. New 1943.
Lodge & Shipley 20″ x 48″. New 1943.
28″ x 34′ "Timesaver," g.h. New 1942.
Carroll Jamieson, 18″ x 5′, C.D.
South Bend, 14½″ x 6′ New 1944.
Lo-Swing 8″ x 36″. New 1942.
Lo-Swing, models IMP and R.
8″ x 15″ and 8″ x 21″ Sundstrand Automatic. New 1943.
12″ x 21″ Fay Automatic. New 1943.
14″ x 42″ Monarch "Magnomatic." New 1942.

### LATHES, TURRET

Warner & Swasey No. 4A, with chuck, 7½″ hole.
**★Warner & Swasey No. 3A. New 1943.**
Warner & Swasey No. 2A. New 1943.
Jones & Lamson No. 9A. New 1943.
Cisholt No. 3L. Late Model.
Gisholt No. 3. New 1943.
Acme No. 1 Universal, saddle type. New 1941.
Bardons & Oliver No. 7 Ram Type, Bar Feed and Tooling. New 1942.
Gisholt No. 4 Universal, Hydraulic speed selector.
Warner & Swasey No. 5 Universal. New 1941.
Warner & Swasey No. 4 Universal. New 1941.
Warner & Swasey No. 3 Universal. New 1942.
Bardons & Oliver No. 3 Universal, motor in base. New 1941.
Warner & Swasey No. 2. New 1942.
Bardons & Oliver No. 2, bar feed. New 1941.

### MILLS

Milwaukee No. 2H Universal. New 1942.
Cincinnati No. 2M Universal.
**★Cincinnati No. 2MH Universal. New 1942.**
Brown & Sharpe No. 2A Universal. Late type.
Kempsmith Maximiller Plain, No. 3.
Brown & Sharpe No. 3B Plain. New 1943.
Brown & Sharpe No. 2B Plain.
Cincinnati No 2M Plain.
Milwaukee No. 8H Vertical, latest model.
Cincinnati No. 2 Vertical. New 1940.
Index No. 40H Vertical.
Cincinnati Plain No. 08 and 2-18. Rise and Fall.
Cincinnati No. 1-12 and 1-18 Automatic.
Cincinnati No. 3-36 Hydromatic.
Cincinnati No. 34-36 Hydromatic High column with Hydrotel.
Milwaukee M-24, New 1942.
Milwaukee No. 1248 Simplex.
DeVlieg Supermill, No. 31B.
Brown & Sharpe No. 12. New 1942.
Kent Owens No. 1-14.
Sundstrand No. 00 & 2 Rigidmill.
Whitney Hand Mill, No. 6.
VanNorman Hand Miller. New 1942.

### MISCELLANEOUS

Savage Nibbler, 8″ throat, 3/16″ capacity.
Cleveland Rigidturner, No. 616.
14″ x 20″ Racine Hydraulic Saw.
13″ x 13″ Peerless High Speed Saw.
11″ x 11″ Peerless Hydra Cut.
No. 26F Norton Hydrolap.
No. 8-6 Zeh & Hanneman S.S. Geared Press.
Reliance 45 Ton Press. New 1942.
Williams White No. 14½ Punch, 1″ through 1″.
Tapper, Leland Gifford 3′ Radial, No. 3 M.T. New 1941.
Parker Tube Bender, No. 824G.
Schauer, Colbourne & Vera Speed Lathes.
5 H.P. L'Hommedieu Buffer.
5 H.P. Clark Buffer.
18″ Gardner Disc Grinder.
Langelier Type "D" Swager. New 1941.
Hendley & Whittemore Type 3C Punch & Shear.

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Ohio Planer, 36″ x 36″ x 16′ M.D.
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Cincinnati Planer, 52″ x 36″ x 40′, Four heads. Box table D.C. motor drive.
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6x18" Landis, m.d.
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6x32" Fitchburg Type A, m.d., late
8x18" Cincinnati Saddle Type, m.d.
8x36" Cincinnati Saddle Type, m.d.
No. 10 Brown & Sharpe Self-Contained, m.d.
No. 11 Brown & Sharpe Self-Contained, m.d.
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10x36" Cincinnati Hydraulic, m.d.
10x48" Brown & Sharpe, belt
10x72" Brown & Sharpe, belt
10x72" Landis, m.d.
12x36" Landis, m.d.
12x48" Cincinnati Plain Self-Contained, m.d.
12x48" Cincinnati, with spline grinding attach.
12x48" Modern, belted m.d.
12x96" Landis, m.d.
14x18" Cincinnati, m.d.
12x48" Cincinnati Plain Self-Contained, m.d.
14x52" Norton, motorized
16x48" Landis Type D, m.d., latest
20x120" Landis Self-Contained, m.d.
26x96" Landis Self-Contained, m.d.

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No. 1 Brown & Sharp, m.d., latest
12x24" Cincinnati Self-Contained, m.d., latest mechanical type
No. 2—12x30" Brown & Sharpe, belt
12x30" Landis Hydraulic, m.d., latest
12x36" Cincinnati Self-Contained, m.d.
12x36" Cincinnati, belt
12x48" Cincinnati Hydraulic, m.d., latest
12x48" Cincinnati, arranged for spline grinding
12x48" Norton, m.d., latest
16x48" Cincinnati, belted m.d.
18x48" Cincinnati Hydraulic, m.d., latest

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7½ H.P. United States, m.d., new

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No. 16-22" Bryant, m.d., latest
No. 16RS Bryant m.d., latest
No. 16-38 Bryant, m.d., latest
No. 6, 10, 20 Bryant, belt
No. 24-21" Bryant, m.d., late
No. 24-36 Bryant, m.d., latest
No. 49 Heald Single End Borematic, m.d.
No. 70 Heald, belt
No. 72A5 Heald Plain, m.d.
No. 72A3 Heald Sizematic, m.d.
No. 72A3 Heald Gagematic, m.d.
No. 72A5 Heald Sizematic, m.d.
No. 72A5 Heald Plain, m.d.
No. 72A5 Heald Plain, long bed type, m.d., latest
No. 73 Heald Airplane Cylinder, m.d., brand new, latest
No. 74 Heald, m.d.
No. 172 Heald Gap, m.d., brand new, latest type
No. 649-16 Van Norman Automatic Oscillating Radius, m.d., latest

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No. 3 Abrasive m.d.
No. 10 Blanchard Rotary, m.d.
No. 11 Blanchard Rotary, m.d., latest
No. 16 Blanchard, m.d., 26" chuck
No. 16 Blanchard, m.d., 30" chuck
No. 22-12" Heald Rotary, m.d.
No. 25A-16" Heald Rotary, m.d., latest
No. 25A-24" Heald Rotary, m.d., latest
No. 33 Abrasive Vertical, m.d.
No. 260-16" Heald Rotary, m.d.
10x12x60" Norton Hydraulic Surface, m.d., latest
14" Pratt & Whitney Vertical, m.d.
18x60" Thompson Hydraulic, m.d., late
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No. 6C Potter & Johnston, m.d.
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4 spindle ⅞" Cleveland Model M, m.d.
4 spindle 2" Cleveland Model M, m.d., bar
4 spindle 2¼" Cleveland Model K, m.d.
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3' American Sensitive, cone
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4' American Sensitive, m.d. on arm
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5' American Triple Geared, 13" col., gear box
5' 15" American Triple Purpose, gear box m.d.
5' 13" Cincinnati-Bickford m.d.
5' Cincinnati-Bickford Full Universal, gear box
5' Cincinnati-Bickford Plate Hole Driller, m.d. on arm
5' Prentice Plain, m.d.
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6' Niles-Bement-Pond Semi-Universal, m.d.
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Gisholt #4, 5, Late, 2L M.D.
Hardinge 2nd Operation Machines, Late, ESM 59
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Norton 6 x 18", Hyd. Surface, M.D., Late
Heald No. 25A Rotary Surf. Like New
No. 2 Cincinnati Centerless, M.D., Filmatic 1943
Cinn. 12 x 36" Univ. Hyd., Late, Filmatic
Thompson 6 x 18" Hyd. Surface, Type C & F
K.O. Lee A 600 Tool Cutter
P. & W 14", B.B., Vert. 19 x 49
Blanchard 30", M.D.; Modern 12 x 48", M.D.
Norton Hydraulic, 12" x 18", M.D.
Heald No. 72A3 Gagematic, Internal
Norton 50" x 28' Roll Grinder
Landis 6 x 20", Hydraulic, M.D.
Nos. 55, 60, 65, 70 Heald Int., M.D.
B. & S. Nos. 1, 3, Univ., Bryant No. 12, M.D.
B. & S. Nos. 10, 11 S.P.D., #2, 2B Surface
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B. & S. Nos. 2, 2B Surface, M.D., Late
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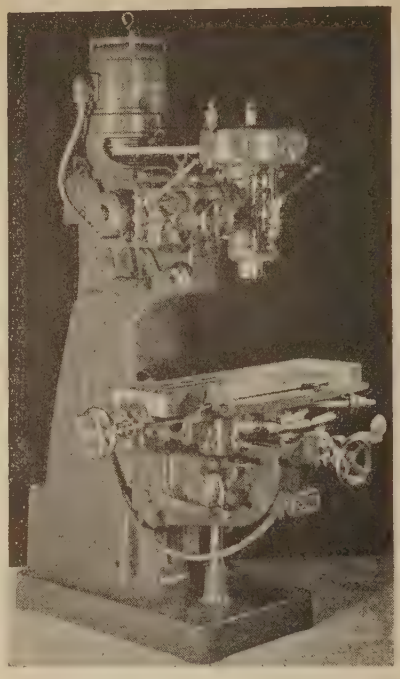

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Acme Gridley RBG 6 Sp. 2⅝", 1944
Cone 8 Spindle, 1⅞" Late, Bar Feed
Cleveland Model A, 1½", ⅝", 1¼", 2"
Cleveland Model B, 1", 2"
⅞" Cone 4 Spindle, Gridley
B. & S. #4 & 6 Auto.
B. & S. 00G, Late, 3 in Stock

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Kling 10' x ⅜" Cap. Bending Rolls
Bliss #18, 19, 20, 21 OBI Presses
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Lennox Throatless shear ¼" cap., Marshalltown
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Landis #6 Thread Grinder, Late
Ohl 12' 10 Ga. Brake, Buf. 25 UD Iron Worker
Bliss #4 Backwheel Press, 47, 3A Horning
Bliss No. 58, 62, 62A, 162 O.B. Gap Presses
Marvel 6A Auto. Hacksaw, M.D., #8 Bandsaw
McKenzie Chip Separator, Barrett Extractor, DeLaval
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Onsrud Router W 240, Late
Z & H 35 Ton, Niagara 44A Backwheel
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Dreis & Krump, 334 Press Brakes, Wales Dies
Baker #2 Keyseater, Clark Hardness Testers
Chicago, Pexto, Ohl Shears, Brakes to 8'
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#2 BM Sutton Straightener (1944)
#2 Cincinnati Centerless Grinder
#3 Cincinnati Centerless Grinder
H. K. Porter Gasoline Locomotive

**The J. & E. Company**
1420 S. Penn Sq., Phila. 2, Pa.



1—Worthington — two stage air cooled type V3-A2, size 7-7-6x5 — Max. pressure 125 lbs. — 30 H.P. G.E. induction motor, 60 cycle — 3-phase, 220 volt, 1760 R.P.M. with starter — 6V belt drive. Cubic ft. per min. — actual delivery, 150 lbs.

**The Toledo Desk & Fixture Co.**
Maumee, Ohio



**ASSEMBLY LINE FOLLOW THROUGH**

Aircraft plants - Metal workers - Telephone, Radio, Vacuum cleaner, Washing machine manufacturers use Topflight's Pressure Sensitive, Self - Adhesive Tape. Easy to Apply.

**TOPFLIGHT-TAPE CO. YORK PA.**

ENGINEERED REBUILT MACHINE TOOLS

BUILT MACHINE TOOLS ENGINEERED REBUILT

## SIMMONS has the Heavy TOOLS

### PUNCHES & SHEARS

7/8" x 7/8" with 36" throat
5/8" x 5/8" with 42" throat
1 1/4" x 1" with 48" throat
1 3/4" x 1 1/8" with 60" throat
1 1/8" x 1" Double End.
165-Ton Guillotine, 14" knives
No. 2 Canton Alligator
10' x 1/16" Ohl Squaring
No. 215 Stoll Rotary

### SAWS

60" Newton Cold Cut-Off
120" Newton Cold Cut-Off
9" x 9" Peerless High Speed

### BORING MILLS

24" x 36" Bullard New Era, Spiral Dr.
36"—44" N.B.P. Turret and side head
61" Bullard Maxi-Mill
72" & 84" Niles-Bement-Pond
10' Betts, Side Hd.
10' & 12' N. B. P. 2-heads
5" Bar N.B.P. Horizontal
6" Bar Simmons Cylinder (1943)
8" Bar Niles Floor Mill
10" Bar Sellers Floor Mill
No. 7 Barrett Cylinder, 8" Bar

### GEAR HOBBERS

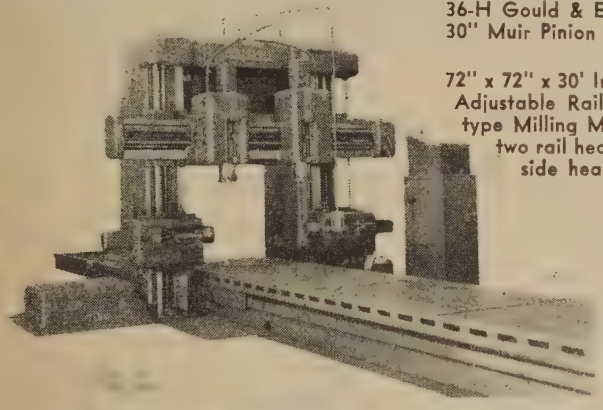
150" Muir Gear Hobber
84-H Gould & Eberhardt
36-H Gould & Eberhardt
30" Muir Pinion Hobber

### RADIAL DRILLS

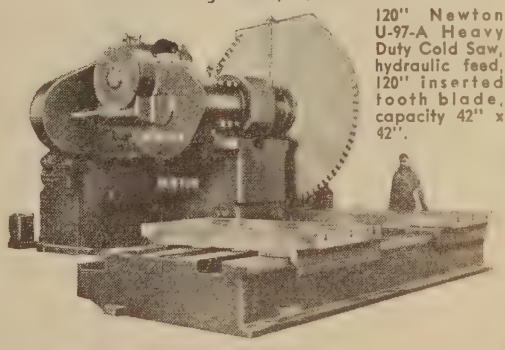
5'-6' & 7' American, plain
6' Cincinnati-Bickford
6' & 8' N.B.P. Heavy Duty
8' American Triple Purpose

### PLANERS

16' x 12' x 35' Niles Variable Voltage Drive with 75 KW generator, 4-heads, forced feed lubrication, automatic tool lifters, approximate weight 400,000 lbs.
128" x 95" x 30' Simmons 230 V. D. C., 4-heads, new 1944, approximate weight 200,000 lbs.
15' x 9' x 35' Detrick & Harvey convertible openside, 4-heads, 100 hp, 230 Volt D. C., approximate weight 500,000 lbs.



72" x 72" x 30' Ingersoll Adjustable Rail Planer type Milling Machine, two rail heads, two side heads, late type.



120" Newton U-97-A Heavy Duty Cold Saw, hydraulic feed, 120" inserted tooth blade, capacity 42" x 42".

**SIMMONS MACHINE TOOL CORPORATION**
MAIN OFFICE AND PLANT, 1721 N. BROADWAY, ALBANY 1, N. Y. NEW YORK OFFICE: 50 EAST 42ND STREET

ENGINEERED Machine Tool REBUILDING

## STOCK TOOLS
### Immediate Shipment

**BORING MILL,** Hor. No. O G & L, M.D.
**BORING MILL,** Vert. 14' Niles, M.D.
**BROACH,** Hor. Hyd., XA Oilgear, 60" stroke
**GRINDER,** Cyl., 14" x 72" Norton, M.D.
**GRINDER,** Internal, No. 72A5 Heald. M.D.
**GRINDER,** Knife, 120" Springfield, M.D.
**GRINDER,** Roll, 24" x 240" Norton
**HAMMER,** Pneumatic No. 4B & 6B Nazel
**HAMMER,** Bd. Drop, 1000#, Billings & Spencer
**HAMMERS,** Steam Drop, 4000 & 5000# Erie
**MILLERS,** Pl. Nos. 3, 4 & 5 Cincinnati
**MILLER,** Vert. No. 4 Kempsmith, table 18x76"
**PLANER,** 72" x 72" x 20' N-B-P, 2 hds., M.D.
**PRESS,** S.S., 250 Ton Chambersburg, Hyd.
**PRESS,** Wheel, Hyd., 400 Ton Niles, 88" x 18'
**ROLLING MILL,** Reclaiming A-12" Ajax
**SHEAR,** Alligator, No. 6½ Mesta, 6½" sq.
**SHEAR,** Bar, No. 4 United, 3½" sq.
**SHEAR,** Bar, Macintosh-Hemphill, 2" sq. alloy steel
**SHEAR,** Bar, Macintosh-Hemphill, 1½" rd. alloy steel
**SHEAR,** Bar Guillotine, 6x1" alloy steel
**SHEAR,** Plate, 132"x1½" Morgan, 26" throat
**SHEAR,** Sq. No. 448 Stoll, 48"x3/16"
**SHEAR,** Sq. No. 372 Stoll, 72"x⅛"
**STRAIGHTENER,** No. 0 H & J, 96"x5½"
**STRAIGHTENER,** No. 0 Medart, 2" tubing

**LANG MACHINERY COMPANY**
28th St. & A. V. R. R. • Pittsburgh 22, Pa.

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WE ARE IN THE MARKET FOR YOUR SURPLUS

## METAL CUTTING TOOLS

DRILLS, TAPS, DIES, REAMERS, MILLING CUTTERS, HACKSAW BLADES AND FILES

## SEND US YOUR LIST

**DEWITT TOOL CO.** 173 GRAND ST., N. Y. 13, N. Y.

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Liberty 48" x 48" x 18' four head planer, 1942
Bullard 36" vertical turret lathe, New Era, #12,000
B & S #3A universal milling machine, fully equipped, 1943

**JOHNSON MACHINERY COMPANY**
59 Edison Place, Newark 2, N. J.

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Bliss #20 O.B.I. Press, M.D., $595.00.
Bliss #61 Gap Press, 2" stroke, $595.00.
Bliss #2 Punch Press, back fly wheel geared, $595.00.
W & S Turret Lathe, #2A 2½" hole in spindle, excellent condition, $1095.00.
Pexto Forming Rolls, hand, 4' x 3", perfect, $275.00.
Motor D.C. 15 h.p., variable speed, 230 volts, $250.00.

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366 Forrest Street, Baltimore 2, Maryland
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FOR SALE

1—#2 Savage Roller Type Nibbling Machine, complete with circular attach. V-belt drive to 3 HP motor. Good condition.

PHILADELPHIA TRANSFORMER CO.
BOX 566 - - - DALTON, PENNA.

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## (NEW) SPOT WELDERS

| QU. | KVA | MAKE | THROAT | CAPACITY |
|---|---|---|---|---|
| 5— | 5 | Peer | 12" | 2— Pcs. #20 Ga. |
| 1— | 7½ | Peer | 6" | 2— Pcs. #16 Ga. |
| 1— | 7½ | Peer | 12" | 2— Pcs. #18 Ga. |
| 1— | 10 | Peer | 18" | 2— Pcs. #16 Ga. |
| 2— | 15 | Peer | 24" | 2— Pcs. #13 Ga. |
| 2— | 20 | Peer | 24" | 2— Pcs. #13 Ga. |
| 1— | 30 | Peer | 24" | 2— Pcs. #11 Ga. |

NOTE:—10 KVA to 30 KVA Machines equipped with Automatic Timers.

## (REBUILT) SPOT WELDERS

| | | | | | |
|---|---|---|---|---|---|
| 1— | 20 | Peer | 24" | 2— Pcs. | #12 Ga. |
| 1— | 30 | Peer | 24" | 2— Pcs. | #11 Ga. |
| 1— | 50 | Peer (Air Operated) | | 2— Pcs. | # 9 Ga. |

With Square D Timer

IN STOCK—IMMEDIATE DELIVERY

**DELTA EQUIPMENT COMPANY**
148 N. 3d St. PHILA. 6, PA.

# THE CLEARING HOUSE

## ReMANUFACTURED MACHINE TOOLS
-(ORIGINATED BY US)-
Reg. U. S. Patent Office

**AUTOMATICS**
No. 6 Brown & Sharpe
No. 2 Brown & Sharpe
1⅝" Greenlee, 6 spdls.
No. 6i New Britain, 6 Spdl-2¼"

**BORING MILLS**
36" Rogers
72" Cincinnati
84" Betts

**DRILLS**
No. 150 Baker
No. D-8 Colburn, No. 6 M.T.
No. 2 LMS—26"—2 Spdl. L-G (1945)
No. 2MA-6—15"—4 Spdl. Avey
No. 2 LMS—26"—4 Spdl. L-G
No. 4 BL Natco—36 spdls.
7'-15" Col. American Univ. Radial

**GEAR MACHINERY**
No. 712 Fellows Auto Indexing (1942)
No. 18-H Gould & Eberhardt
No. 13 Gleason Tester
11" Gleason Bevel Generator
72" Cincinnati Gear Cutter

**GRINDERS**
4"x12" Landis, Model H (1942)
4"x18" Landis, Model H (1942)
6"x18" Norton Type C Plain (1943)
6"x30" Norton Type C Plain (1943)
10"x18" Norton Type C Plain (1943)
Norton Motor Driven Plain Grinders
6"x18" ——— to ——— 240"
12"x36" Landis Univ. Type LCH (1945)
No. 5 Covel Hydraulic Surf. (1941)
24"x24"x84" Mattison Hydr. Surf.
No. 34 Abrasive Surf. (1943)
No. 22—12" Heald Rotary Surface
No. 25A—24" Heald Rotary Surf. (1943)
72A-3 Heald Internal Gdr. (1943)
72A-5 Heald Internal Grinder (1942)
No. 5 Bryant Internal Grinder
No. 24—26" Bryant Internal (1942)
10"x72" Colonial Broach GDR.

**HORIZONTAL BORERS**
No. 3i Lucas 3" Bar
No. 3A Universal 3" Bar
No. 26—4½" Bar Defiance (1943)

**LATHES**
14"x8' Hendey
15"x5' Sebastian
16"x54" Centers LeBlond
22"x48" Centers Monarch (1942)
36"x30' Lodge & Shipley
36"-48"x16' Lehman Hydrotrol (1945)
48"x20" Simmons (1942)
50"x17' Centers LeBlond (1942)
8"x15" Sundstrand (1942)
10"x22" Sundstrand, Model AA (1943)
12" x 18" Lipe-Carbo
16"x33" Fay Automatics (1942)
20"x25" Fay Automatics (1942)

**MILLING MACHINES**
No. 2H Milwaukee Vert. (1942)
No. 2 Cincinnati Vert. (1942)
No. 2M Cincinnati Vert. (1941)
No. 3 Cincinnati High Power Vert.
No. M-18 Milwaukee Simplex (1942)
No. M-24 Milwaukee Simplex (1942)
No. 1-18 Cin. Mfg. (1940)
No. 2-18 Sundstrand Electromil (1942)
No. 4-48 Cinn. Plain Hydromatic (1942)
No. 45-48 Cinn. Plain Hyd. Tracer (1942)
No. 56-90 Cinn. Plain Hydromatic (1943)
4"x9" Hanson-Whitney Thread Miller
4½"x12" Pratt & Whitney, Model C
6"x20" Pratt & Whitney, Model C
6"x36" Lees-Bradner Thrd Miller (1942)
6"x132" Pratt & Whitney Thrd Miller
38"x40"x10' Fitchburg Duplex (1943)
24"x24"x12' Ingersoll Adj. Rail
36"x36"x16' Ingersoll adj. rail. 4 hds.
72"x6' Ingersoll Face Miller

**PLANERS**
36"x36"x12' Cincinnati
36"x36"x18' Gray
48"x36"x14' Gray
48"x48"x12' Cincinnati

**TURRET LATHES**
No. 2 B. & S. Screw Machine, Wire Feed
No. 5 Warner & Swasey (1942)
No. 5 Bardons & Oliver (1942)
No. 5 Foster, Bar Feed (1942)
No. 2A Warner & Swasey
1-H Libby, Extra Long Bed
No. 1-H Libby, 6¼" Spdl. Hole
No. 4A Warner & Swasey, 7½" Spdl. Hole

**MISCELLANEOUS**
18" Dill Slotter
No. 22-C Racine Shear Cut Saw
No. 0 Bakewell Tapper
No. 20 Bliss O.B.I.
Model H-7 Micromatic Hone
Model H-705 Micromatic Hone
Model 200 Micromatic Hone

**HILL-CLARKE MACHINERY CO**
647 Washington Blvd. - Chicago

## BROACHES
Twin Ten Oilgear duplex
No 3XA Oilgear
No. 3L Lapointe
9 ton American horizontal
30 ton No. V48 American vertical
No. 1 Foote Burt duplex vert. surf.

## DRILLS
21" & 24" Cincinnati Bickford upright
Nos. 121, 217, 315 Baker heavy duty
No. 217 Baker 3 spindle
6'-15" Cincinnati Bickford radial
22" Barnes All Geared 2 spindle
20" Colburn Mfg., 1 and 4 spindle
3", No. D3 Colburn heavy duty
No. B4A Natco multiple Holetapper
8 spdl. No. 11 Natco multiple
22 spdl. No. 14 Natco multiple
34 spdl. No. 30 Natco multiple
42 spdl. No. B16 Natco multiple
24 spdl. No. 2 Baush multiple
12 spdl. No. 39 Natco rail type

## GEAR MACHINERY
Nos. 8H, 12H & 16HS G.&E. hobbers
No. 12 Barber Colman hobbers
No. 130 Cleveland Rigid hobber
Nos. 1, 5A & 5AC Lees Bradner hobbers
48", No. 4 B.&S. automatic spur
24" Flather automatic spur
No. 5M Adams Mfg. hobber
No 12 Gleason 2 tool bevel rougher
10" Pratt & Whitney 2 wheel grinder
No. 7 Fellows gear shapers
18" Gleason testers & lappers
8" Red Ring gear lapper
No. 50 Cross tooth rounder
Lipe & Cimatool tooth rounders

## GRINDERS, DISC
20", No. 208 Besly
26", No. 226 Gardner
30", No. 86 Gardner horizontal
15", No. 115 Gardner opposed disc
30", No. 230 Hanchett opposed disc

## GRINDERS, INTERNAL
Grenby toolroom
Majestic toolroom
Bryant Nos. 16CP16, 16-28, 16F28 & 16-38
Heald Nos. 75, 75A, 72A3 & 72A5 plain
Nos. 72A3 Sizematic
No. 72 Electric indicator automatic

## LATHES, ENGINE
14"x 6' Mulliner
14"x 6' Lodge & Shipley
15"x 6' Porter McLeod
18"x 8' Lodge & Shipley
36"x 16' Bridgeford

## MILLERS, PRODUCTION
Nos. 1, 1M & 2 Kent Owens hand
No. 28-60 Cincinnati Hydrotel
No. 45 Productomatic
No. 1 Davis & Thompson drum type
4" Pratt & Whitney spline
4" Rice Barton spline
No. MM-1-60 U.S. Multi-Millers
30" Newton continuous rotary
30", 42" & 84" Ingersoll continuous rotary
Small Ingersoll drum type
24"x24"x16' Ingersoll adj. rail planer type
24"x20"x20' Ingersoll planer type
51"x21"x20' Ingersoll planer type
Types C&D Hall planetary thread
No. 3 Planomill thread
7½" x 11½" Hanson Whitney thread
No. 4 Lees Bradner univ. thread
No. CT 36 Lees Bradner thread
No. 32 Kempsmith Lincoln type
Nos. M18, M24 & 12-24 Kearney & Trecker
No. 08 Cincinnati, horiz. or vert.
12" Cincinnati, plain Mfg.
24" Cincinnati, plain or duplex
Nos. 1-18, 2-18 & 2-24 Cincinnati automatic
Nos. 2-18 & 2-24 Cncinnati Rise & Fall
Nos. 3-24, 4-36, 4-48, 5-48, 34-36, 56-72 & 56-90 Cincinnati Hydromatic
No. 12 Brown & Sharpe Mfg.
48" Cincinnati duplex automatic
No. 33 Sundstrand openside, 2 vertical spindles, 18" x 140" table, adjustable rail.

**MILES MACHINERY CO.**
SAGINAW, MICH.

#6½ H. & J. Plate Shear Cap. 1 x 10; 36" throat; holddown; M.D.
Bar Shears Open End & Guillotine 2", 2½", 3", 3½"
National High Duty Upsetting and Forg. Machs. guided overarm heading slide, susp. slides, 2", 5"
Ajax & Acme Upsetters, not susp. slides ¾", 1", 1½", 2", 2½", 3"
W. W. Bulldozers, #26, #29
#663 Toledo Knuckle Joint Coining Press 400-tons
#EG-54 Ferracute Coining Press 400-tons
8" Landis motor driven Pipe Threader 4" & 8" hds.
Trimming Presses 50 to 125-tons
Open Back Inclinable Presses 8 to 50-tons
#12 Z. & H. Percussion Screw Press 150-tons
Board Drop Hammers 400#, 1000#, 1200#, 1500#, 2500#, 4000#
100# Bradley Upright Strap Hammers, 1943
Bradley Helve Hammers 40#, 100#, 200#; 50# Compact
Misc. Forging Machinery, Forg. Rolls, Hot Saws, Die sinkers
**BOLT, NUT & RIVET MACHINERY.** Single and Double Stroke, Solid and Open Die Cold Headers, 3/16" to ¾", Cold Bolt Trimmers, Slotters, Thread Rollers, 1/16" to 1", some automatic, Landis Threading Machines, Economy Auto. Pointers and Threaders, Wood Screw Pointers and Threaders and Shavers and Slotters.
#2 Cincinnati Centerless Grinder, Filmatic
Bearings Lathe, American Geared Hd, 24"x16'.
#3 B. & O. Univ. Turret Lathe, 1942.
Diamond Face Grinder, Segment Wheel 36", Table 84x24". Hydraulic operated.
Doall V-36 Metalmaster Saw.
Racine Heavy Duty Hydr. Hack Saw, 12x12.

**Donahue Steel Products Co.**
1913 W. 74th Street, Chicago 36, Ill.

## BARGAIN
#41 AIRCO TRAVOGRAPH
FLAME CUTTING MACHINE
LATEST MODEL
Complete with TRACK, TORCHES, GAGES, HOSE, MOTOR GENERATOR SET, ETC.

**R. H. FORNEY**
P. O. BOX 310 NEW CASTLE, PA.

## 13' x ⅜" SHEAR
DREIS & KRUMP
CHICAGO ALL STEEL
*IMMEDIATE DELIVERY*

**JOSEPH HYMAN & SONS**
TIOGA, ALMOND & LIVINGSTON STS.
PHILADELPHIA 34, PENNA.

**NORTON ROLL GRINDER**
50" x 28' M.D.
Niles-Bement-Pond 2500 Lb.
Single Frame Steam Hammer
*Wire, Write or Phone*
AARON MACHINERY CO., INC.
45 Crosby St. New York 12, N. Y.
Wo. 4-8233

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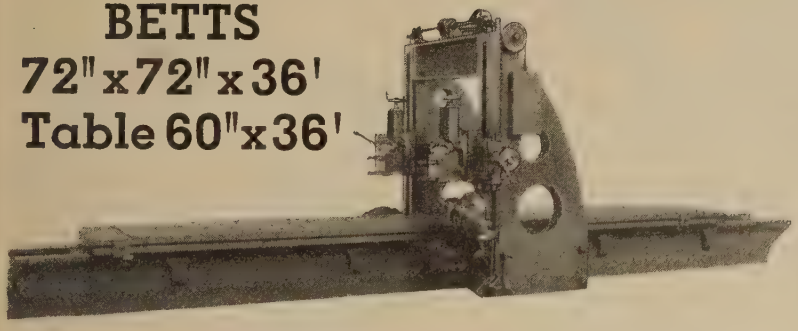
## Outstanding 36 foot Planer

**BETTS**
**72"x72"x36'**
**Table 60"x36'**



2 Heads on Cross Rail
2 Side Heads
Direct Connected D.C.
Reversing Motor Drive
Individual Motor for
Power Raise and
Lower of Rail

**36" OHIO UNI.**
**Heavy Duty Shaper**

FOR IMMEDIATE DELIVERY

- *96" x 72" x 25' NBP Double Housing Planer*
- *72" x 64" x 14' Ingersoll Planer Type Mill (3 Heads)*
- *54" x 18' Houston-Stanwood & Gamble Heavy Duty Engine Lathe*
- *2000 Ton HPM. Fastraverse Hobbing Press*
- *16'—24' NBP Extension Type Boring Mill*
- *7" Detrick & Harvey Horiz. Planer Type Boring Mill*
- *No. 1 Hilles & Jones Plate Straightening Rolls*
- *27" x 38' Lehmann Hydratrol Hollow Spindle Lathe*

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## EMERMAN MACHINERY CORP.

**875 W. 120th STREET** **CHICAGO 49, ILL.**

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12" Cox Pipe Bender, motor driven.
Vertical Hyd. Grinder, Hatchett Model 300, used 6 mos.
Grinder, Norton Horizontal External Cylindrical, Type C, 16x36, head travel 8" —1942
Norton Hyprolap, 26KF — 1943.
Bliss Presses No. 88 (255-ton, 24" stroke) No. 305A (190-ton, 8" stroke).
Chip Crusher, American Pulverizer Type St T.
1½" Shackles, screw pin type, galv. new — 10 or more $1 ea.

**Elyria Belting & Machinery Co.**
BOX 5 ELYRIA, OHIO

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## ALL LATE TYPE TOOLS

18" x 12' SPRINGFIELD Lathe
No. 3 WARNER & SWASEY Turret Lathe
No. 2 CINCINNATI Vert. Mill, Dial Type
No. 4 CINCINNATI Plain Mill, Dial Type
6" x 18" CINCINNATI Cyl. Grinder
No. 615A FELLOWS Gear Shaper
12" GLEASON Bevel Gear Generator

**O'CONNELL MACHINERY COMPANY**
1821 Niagara Street Buffalo 7, New York
BEdford 8500

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## SLITTER

Lamb & Nash, 38" width x 12 ga. Excellent condition. Priced to Sell.

**ARKO PRODUCTS CO., INC.**
546 Second Avenue, Detroit 26, Mich.

# THE TOOLS YOU WANT—*BUT RARELY FIND*

## VERT. & HOR. BORING MILLS

3" bar Univ. Table Type, S.P.D.
3½" bar Landis #35, Floor Type
4" bar Foot-Burte hvy., floor type, 1942
4" bar Universal Table Type, 96" spin. to outer support, 60" spin. to tbl., 1943
4" bar Landis #40, Floor Type
**5" bar Sellers, Table Type, 120" spin. to outer support, 48" spin. to table, 1943.**
5" bar Fisher, Floor Type, 1942
6" bar Ingersoll Floor Type, hvy., 1945
12' Betts, 2 hds., M.D.
30" Colburn, 1 turret head, M.D.
**36" Bullard Spiral Drive, 4 Jaw**
42" King, P.R.T., M.D.
48" N.B.P. Car Wheel
53" N.B.P. 2 hds., P.R.T.
72" Cinci. Rapid Production, M.D.

## LATHES

No. 4 B LeBlond Boring, Capty. 28' & 20'6" (2), 1942
14" x 30" cc Reed-Prentice Tool Room
14" x 54" cc Sidney Tritrol Tool Room
14" x 54" Centers Sidney, T.A., M.D.
16" x 24" Centers Monarch, T.A.
16" x 54" Centers Springfield, T.A., M.D.
No. 16 LeBlond Auto. Production, 1942
18/36" x 8' Fay Scott, Gap, Q. C. G., M.D.
18" x 120" centers Amer. T.A., Cone, M.D.
18" x 86" centers Hendey, T.A., M.D.
25" x 18' Bed LeBlond, M.D.
28/48" Harrington, sliding bed gap.
30" x 12' Bed LeBlond, T.A., M.D.
32" x 12' centers H.S.G., T.A.
36" x 32' Bed N.B.P., 2 carr., T.A.
50" x 17' centers LeBlond, 1942
**50" x 19' centers N.B.P., taper, AC, 1942**
52" x 20' Centers N.B.P., Grd. Hd., M.D.
72"-84" x 25' centers Washington, 1943

## TURRETS & AUTOMATICS

3L Gisholt, 1942
Nos. 5, 4, 3 & 2 W. & S. Univ., Late
No. 4 Gisholt Univ., Bar 1942
No. 5 DLX Potter Johnson Auto., 1942

## RADIAL DRILLS

2B-8 Edlund 8", 1 Spin. (2), 1942
2½' Amer. Trip. Purp., 9" col., M.D.
3 Spin. Leland-Gifford, #1 LMS, 1943

**7' Carlton 17" col., 2' extra high, 1943**

42" Baush Radial Tapper, ½" capty., 1941

## MILLING MACHINES

No. 2 Van Norman Duplex
4" Rice Barton Spline, 1942 (2)
12" x 102" Lees-Bradner Thread Miller
1848 K. & T. Simplex, 1944
24" x 24" x 16' Ingersoll Planer Type, 4 swivel hds., 20 h.p., AC, M.D.
#1—8 Kent Owens, Hyd.
#2A B.&S. Univ., 1942
#4 Kempsmith Maxi-Mil, Vertical
No. 4K K. & T. Dial Pl. Horiz.
No. 1-A Simmons Micro Speed M.D.
No. 0 B. & S. Plain, M.D.

## GRINDERS

60" P. & W. Vert Surface, 1942
52" Besly #372, vert., spin., disc, AC dr., '45
#42 Heald Boremat ic, Late
#47A Heald Boremat ic, Late
24" x 240" Norton Cyl., M.D.
17" x 28"-40" Norton Crankpin Dbl. Hd.
14" x 72" Norton, Older type
10" x 24" Landis Univ., Hyd., 1942
No. 72A5 Heald Plain Internal, 1943 (8)
No. 72A3 Heald Sizematic, 1942 (3)
8" x 48" J. & L. Thread, 1941
6" x 18" Norton, Pl. Hyd., Late
Nos. 35 & 31 Excellos (2)
10" x 48" Cinci Pl. Cyl., 1942

## PLANERS

24" x 24" x 16' Ingersoll Planer Type 4 swivel hds., 20 H.P., A.C., M.D.
**36" x 36" x 12' Cinci. Hypro, 4 hds., var. voltage, AC dr., 1943.**
42" x 18" x 16' N.B.P. Frog & Switch with 50 h.p., AC, M.D.
**48" x 48" x 24' Gray, 4 hds., var. v., A. C., 1942**
48" x 48" x 26' N.B.P., 4 hds.
54" x 48" x 18' N.B.P., 4 hds.
60" x 60" x 26' N.B.P., 4 hds.
84" x 84" x 26' Betts, 4 hds.
120" x 96" x 26' Cinci., 4 hds.

## PRESSES, PUNCHES, ROLLS, SHEAR

Multi Punch, No. 7 H. & J., 14" throat
#20 Bliss O.B.I.
250 ton WATSON STILLMAN HOR. HYD. CRANKPIN AND FORCING PRESS
56 ton Diamond Grd. O.B.I., new, M.D.
55 ton Diamond Fly. O.B.I., new, M.D.
31 ton Diamond Grd. O.B.I., New, M.D.
30 ton Diamond Fly. O.B.I., New, M.D.
72" Clev., S.E. Punch, 1¼" x 1"
72" x ⅜" Bertsch 7 Roll Straightener, AC, M.D., new 1942
36" x 16 Ga. Niagara, 18" Gap
10' x ¾" Hilles & Jones 7 Roll Straightener, AC, M.D., late type
15' x ¾" Wickes Pyr. Rolls M.D.

## MISCELLANEOUS

BOLT THREADER, 1" Landis
GEAR SHAPER, No. 75 Fellows
HAMMER, 2500 Lb. Chambersburg, dbl. FR, air, forge
HAMMERS #4B & 4-1, Nazels, M.D.
KEYSEATER, No. 0 Baker, M.D.
KEYSEATER, No. 5 M & M
SAW, No. 9 Marvel, 10" Capty.
SAW, 6" Racine Oil-cut, 14' Feed Rack
SHAPERS, 16" G. & E., M.D. (2)
SHAPER, 24" Milwaukee Motorized
SLOTTER, 20"-24" Dill, M.D.
**SLOTTER, 48" N.B.P., grd., late**

CABLE ADDRESS—
Benmachine, New York

**BENNETT MACHINERY CO.,** 30 CHURCH ST. NEW YORK 7 N. Y.

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# BARGAINS!

## MACHINE TOOLS, CRANES, TRANSFORMERS

AJAX 1½", 3½" Heading and Upsetting, M.D.
AMERICAN 5' arm, 13" column Plain Radial, M.D.
BRIDGEFORD 36" x 24' Centers Lathe—M.D.
BRYANT 16-C-16 Internal Grinder, 1941
BULLARD 16", 6 and 8 spindle Multimatic—1943
CINCINNATI No. 3, No. 4 Vert. Miller, M.D.
CINCINNATI No. 3 Plain Miller Motor Drive
CINCINNATI #3 Centerless Grinder, M.D.
CINCINNATI #4 Plain Miller, Timken Bearing, Rectangular Overarm
CRANES from 5 to 30 ton cap., 230 volt D.C.
FRANKLIN 4½" Bar Table Type Horiz. Boring M.D.
INGERSOLL 32" x 30" x 12' Adj. Rail Slab Miller
JONES & LAMSON "FAY" 20" x 25" Centers Auto. Lathe—1940

CINCINNATI No. 4 Plain Miller, Timken Bearing
KEARNEY & TRECKER No. 4 Plain Miller, Timken Bearing
WARNER & SWASEY No. 5 Univ. Turret Lathe —Timken Bearing

LAKE ERIE 500 ton Vert., Hyd. Press—1942
LANDIS 35, 3½" Bar Floor Type Hori. Boring Mill
LODGE & SHIPLEY 18"x72" Centers, Engine Lathe
LO SWING 8 x 108" centers, Production Lathe, 1941
NAZEL No. 4B Pneumatic Hammer, M.D.
NILES 5" Floor Type Horiz. Boring Mill
NILES 48" x 48" x 18' Planer, 4 heads, A.C., M.D.
NILES 60" x 10' Heavy Duty Engine Lathe—1943
NILES 100" Vert. Boring Mill—2 Swivel hds. M.D.

NIAGARA 1000 KVA Indoor Type Transformer
NIAGARA 1200 KVA Outdoor Type Transformer, Latest Type, practically new

PUTNAM 42" x 25' Centers, Geared Hd. Engine Lathe
VAN NORMAN #3 Duplex Universal Miller
WARNER & SWASEY 3A Univ. Turret Lathe—M.D.
WORTHINGTON 3½ x 18 Duplex Pump—new 1945

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on practically new machines

***At Published Prices***

(1) Potter & Johnston No. 5D2 Automatic Chucking Machine. Two Spindle, Mfg. in 1942. Serial No. 52913.
Price .....$4,350.00

(1) Jones & Lamson Model No. TG615 Automatic Thread Grinder, Serial No. 130156.
Price .....$2,750.00

(1) PRACTICALLY NEW STAMCO PRESS BRAKE 126" x 12 Gauge, Toggle Arm Type.
Price .....$3,500.00

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Price .....$3,750.00

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(4) Pratt & Whitney Gear Grinders, 9" Cap., Model No. M-1635.
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(4) Detroit Gear Grinders, Model No. GG-19.
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**MACHINERY CO., INC.**
517 SOUTH DELAWARE STREET
INDIANAPOLIS 4, INDIANA

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No. 13 B & S Universal Grinder, M.D.
14" x 6' Hendey Lathe, belt
No. 4 Cinn. Vertical Mill, high power
No. 2G B & S Automatic, S.P.D.

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McKay 36" x 4¼" cap. 12 to 28 ga. and 60" x 7½" cap. ½"

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Ransome #16, excellent condition. Head & Tail Stocks, Ser. Nos. 4698-99, 4703-04

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Consisting of Pay-off Equipment, Slitter, and Take-up Reel. For Handling .014" to .125" Cold Rolled Steel in Coils up to 15" Width.

CUTTING CAPACITY:
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10 Cuts in .0625" C.R.S. at 300 F.P.M.
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Lees Bradner Model CT 36" Thread Millers.
SLAB MILLER & SCARFING MACHINE, 24" ROLLS, 75 HP AC, MD.
#33 Ex Cello External Thread Grinders.

**Continental Salvage & Machinery Corp.**
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1—National Hydraulic Thread Roller from ¼" to ⅝".
Manville Thread Rollers up to ½" with Hopper Feed.
Manville Double Stroke Cold Header to 7/16".
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1—Langelier Swaging Machine.
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1—Six Spindle Cleveland Automatic Chucking Machine, 5¾.
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*Machines are late models and motor driven*

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Built to U. S. Navy Spec. by Farrell Birmingham
CAPACITY—2000 TO 15000 LBS.
For Balancing—Propellers, Rotors, (Turbine, Gas Engines & Blower), Reduction Gears, Armatures.
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**18" x 12' Ingersoll Horizontal and Vertical Spindle Keyseating machine—complete with electrical equipment, 10 HP Motor SN 3988.**

**10 x 24 Landis Universal Cylindrical Grinder Motor drive—In fine condition.**

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Immediate Delivery

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5" Stroke
Price . . $13,850.00 F.O.B. on Cars

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Triple Back Gear with twin drive; Marquette Air Cushion and attachments; Stroke Plunger 26"; Stroke Blank holder 18"; Power Elevated adjustment 8"; Shut height 38"; Blank Holder 36"; Bed Area 72" x 72".

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#92½-C Toledo, solid frame, 2" stroke, single back geared, 90 tons capacity.

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2—LATEST TYPE 2⅝" CONOMATIC 6 Spindle Automatic Screw Machines A.C.—M.D., with exceptionally large assortment of collets, cams, gears, etc.

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*New or Guaranteed Rebuilt*
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AT SPECIAL LOW PRICES

HUNDREDS OF OTHERS IN STOCK

**JOSEPH HYMAN AND SONS**
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Number 87 Bliss, 225 ton single crank straight side press 16" stroke, die space 22 inches, bed area between housings 28" x 28", hydraulic clutch, push button control, 95% new.

400 ton Beatty Machine Co. Vertical Bulldozer.

Long & Alstatter multiple punch 48" between housings, 58" ram, 2" stroke, 10" throat, 8" shaft, weight about 50,000 lbs.

**R. A. S. JOHNSON**
53 W. JACKSON BLVD., CHICAGO 4, ILL.

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## *Special Offering*

**1500 TON H.P.M. HYDRAULIC PRESS**
48" x 40" bed; 12" stroke

**AMERICAN "SUPER PRODUCTIVE" LATHE**
42" x 20', 136" centers, 18 speeds.
BOTH LATE TYPE MACHINES
IN EXCELLENT CONDITION

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# MOTORS—CRANES—M. G. SETS

## In Stock—Immediate Shipment—Rebuilt and Guaranteed

### OVERHEAD ELECTRIC TRAVELING CRANES

| Tons | Make | Span | Current |
|---|---|---|---|
| 5 | Northern | 21'0" | 230-VDC. |
| 5 | Northern | 25'0" | 230-VDC. |
| 5 | Shepard | 27'3" | 230-VDC. |
| 5 | Milwaukee | 50'3" | 230-VDC. |
| 10 | Northern | 37'11" | 230-VDC. |

### SQUIRREL CAGE MOTORS
3-PHASE 60-CYCLE

| Qu. | HP. | Make | Type | Volts | RPM |
|---|---|---|---|---|---|
| 2 | 40 | Al. Ch. | AR | 440 | 860 |
| 1 | 40 | Master | PA-445 | 440 | 1200 |
| 3 | 50 | Whse. | CS | 440 | 690 |
| 1 | 50 | F.M. | H-16-A | 440 | 900 |
| 1 | 50 | Al. Ch. | AR-220D | 440 | 1155 |
| 1 | 50 | Ideal | AT-445 | 440 | 1750 |
| 1 | 60 | Whse. | CS-607 | 440 | 880 |
| 1 | 75 | G.E. | KF-542 | 440 | 1200 |
| 1 | 75 | Whse. | CS | 440 | 1750 |
| 1 | 75 | Al. Ch. | AR | 2300 | 1765 |
| 5 | 100 | F.M. | HS-201C | 440 | 880 |
| 2 | 100 | G.E. | KT-556 | 2200 | 865 |
| 1 | 100 | Whse. | CS-760 | 2300 | 1170 |
| 1 | 100 | G.E. | K-544 | 2300 | 1175 |
| 1 | 100 | Al. h. | AR | 2200 | 1160 |
| 1 | 145 | G.E. | I-K | 440 | 1800 |
| 2 | 125 | Al. Ch. | AR | 440 | 435 |
| 2 | 125 | C.W. | 126Q | 440 | 430 |
| 1 | 125 | Whse. | CS-761 | 440 | 1750 |
| 2 | 125 | Al. Ch. | AR | 2200 | 1750 |
| 1 | 150 | G.E. | I-K | 440 | 690 |
| 1 | 150 | El. Mchy. | B.B. | 220 | 1200 |
| 1 | 250 | Whse. | CS | 2200 | 1160 |

### SLIP RING MOTORS—CONSTANT DUTY
3-PHASE 60-CYCLE

| Qu. | HP. | Make | Type | Volts | RPM |
|---|---|---|---|---|---|
| 4 | 25 | G.E. | MT-526 | 440 | 840 |
| 1 | 25 | G.E. | MT-332 | 2200 | 850 |
| 2 | 25 | Whse. | CW-4810 | 220 | 1750 |
| 1 | 30 | Whse. | CW | 440 | 1160 |
| 1 | 40 | Al. Ch. | ARY | 2200 | 435 |
| 3 | 40 | G.E. | MT-346 | 550 | 560 |
| 3* | 40 | G.E. | I-M | 60 | 1170 |
| 1 | 50 | Al. Ch. | ARY | 2200 | 490 |
| 2 | 50 | G.E. | MT-536 | 2200 | 1150 |
| 1 | 75 | G.E. | MT-548 | 440 | 1200 |
| 1 | 125 | Al. Ch. | ARY | 440 | 900 |
| 1 | 150 | G.E. | I-M | 440 | 495 |
| 1 | 150 | G.E. | I-M | 440 | 1180 |
| 1 | 150 | G.E. | I-M | 2200 | 1750 |
| 1 | 200 | G.E. | I-M | 2200 | 580 |
| 1 | 200 | G.E. | I-M | 440 | 580 |
| 1 | 250 | Whse. | CW-1106 | 2200 | 580 |
| 1 | 300 | Al. Ch. | ARY | 2200 | 505 |
| 1 | 300 | G.E. | I-M | 2200 | 1200 |
| 1 | 400 | G.E. | I-M | 2300 | 875 |
| 1** | 600 | G.E. | MT-412Y | 2200 | 720 |
| 1** | 750 | G.E. | MT-414Y | 2200 | 709 |
| 1** | 1200 | Whse. | CW | 2200 | 590 |

*—40-Cy. **—Mill Type 2-Pedestal bearing on cast iron base, complete with REVERSING PRIMARY and MAGNETIC SECONDARY CONTROL.

### SYNCHRONOUS MOTORS
3-PHASE 60-CYCLE

| Qu. | HP. | Make | P.F. | Volts | RPM |
|---|---|---|---|---|---|
| 2 | 50 | G.E. | .8 | 2200 | 600 |
| 1 | 60 | G.E. | .8 | 440 | 1200 |
| 2 | 100 | G.E. | .8 | 440 | 600 |
| 1 | 100 | Ideal | 8. | 220 | 900 |
| 1 | 150 | G.E. | 1.0 | 2300 | 900 |
| 2 | 200 | Al. Ch. | 1.0 | 2300/440 | 360 |
| 3 | 1250 | G.E. | 1.0 | 4160/2300 | 900 |

### MOTOR GENERATOR SETS

| Qu. | KW | Make | RPM. | Volts D.C. | Volts A.C. |
|---|---|---|---|---|---|
| 1 | 5½ | G.E. | 1800 | 250 | 220/440 |
| 1 | 9 | G.E. | 1800 | 250 | 220/440 |
| 7 | 25 | Whse. | 1200 | 120/240 | 220/440 |
| 3 | 50 | Whse. | 1200 | 120/240 | 440/2300 |
| 2 | 35 | G.E. | 1800 | 125 | 220/440 |
| 1 | 50 | Lo. Al. | 1200 | 120/240 | 440/2200 |
| 1 | 75 | Whse. | 1200 | 125 | 220/440 |
| 1 | 75 | Al. Ch. | 900 | 250 | 2200 |
| 1 | 100 | G.E. | 1200 | 250 | 440/2300 |
| 1 | 100 | C.W. | 1200 | 250 | 440/2300 |
| 3 | 150 | C.W. | 1200 | 300 | 440/2200 |
| 1 | 300 | Whse. | 1200 | 125/250 | 2300 |
| 1 | 400 | Whse. | 720 | 550/275 | 2300 |
| 2 | 1000 | G.E. | 514 | 600 | 4150/2300 |

G.E. Rotary Convertor, 2025/2565 KW. 225/285-VDC., 450-RPM., complete with A.C. and D.C. panels and control, 2760 K.V.A. transformer, OISC, 6900-V., 3-Ph., 60-Cy.

### TRANSFORMERS (OIL-COOLED)

| Qu. | K.V.A. | Make | Voltage | PH. | CY. |
|---|---|---|---|---|---|
| 2 | 10 | Whse. | 2400-480/240 | 1 | 60 |
| 2* | 13 | Kuhlman | 480/240 | 1 | 60 |
| 1 | 25 | Al. Ch. | 2300-460/230 | 1 | 60 |
| 1 | 30 | G.E. | 2200/1100-608 | 1 | 60 |
| 3* | 37.5 | Whse. | 460/230-230/115 | 1 | 60 |
| 3 | 50 | Al. Ch. | 22000-220 | 1 | 60 |
| 2 | 50 | Wagner | 13200/11830-575/287 | 1 | 60 |
| 14 (New) | 100 | G.E. | 4330/4160-125/250 | 1 | 60 |
| 6 | 100 | G.E. | 2400-125/250 | 1 | 60 |
| 3 | 130 | G.E. | 19000/9500-2200/550 | 1 | 60 |
| 3 (New) | 150 | Wagner | 8800/4400-2300 | 1 | 60 |
| 3 | 165/247 | G.E. | 38500/22000/11000-480/215 | 1 | 60 |
| 3 | 667 | G.E. | 2300/4000Y-460 | 1 | 60 |

*Air Cooled.

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## RE-NU-BILT

*Guaranteed*

# ELECTRIC POWER EQUIPMENT

## A.C. MOTORS

*3 phase — 60 cycle*

### SLIP RING

| Qu. | HP | Make | Type | Volts | Speed |
|---|---|---|---|---|---|
| 1 | 1000 | Whse. | CW | 2300 | 720 |
| 1 | 900 | G.E. | IM | 2300 | 880 |
| 2 | 700 | Whse. | CW | 2200 | 900 |
| 1 | 500 | G.E. | IP | 550 | 505 |
| 1 | 400 | G.E. | IM | 2200 | 252 |
| 1 | 350 | Whse. | CW | 2200 | 900 |
| 1 | 350 | G.E. | MT-442Y | 2200/4000 | 253 |
| 1 | 300 | Al. Ch. | | 2300 | 505 |
| 1 | 300 | Whse. | CW-885 | 440 | 1750 |
| 1 | 250 | G.E. | MT-563Y | 550 | 880 |
| 1 | 250 | G.E. | MT-424Y | 4000 | 257 |
| 1 | 250 | G.E. | MT-559S | 2200 | 1800 |
| 1 | 135 | G.E. | IM | 2300 | 700 |
| 2 | 100 | G.E. | IM | 2200 | 435 |

### SQUIRREL CAGE

| | | | | | |
|---|---|---|---|---|---|
| 1 | 250 | G.E. | KT-559 | 440 | 1750 |
| 1 | 200(NEW) | G.E. | K | 2300 | 1200 |
| 1 | 200 | G.E. | IK | 550 | 865 |
| 1 | 125(NEW) | G.E. | KF-TEFC | 440 | 1190 |
| 2 | 100 | G.E. | KT-543 | 220/440 | 1750 |

### SYNCHRONOUS

| | | | | | |
|---|---|---|---|---|---|
| 2 | 3500 | G.E. | TS | 2300 | 257 |
| 1 | 2100 | G.E. | ATI | 4600 | 514 |
| 2 | 2000 | Whse. | | 2300 | 120 |
| 1 | 1000 | Whse. | Mill | 2300 | 189.5 |
| 1 | 900 | Al. Ch. | | 2200 | 150 |
| 1 | 600 | Whse. | | 440 | 360 |
| 2 | 500 | G.E. | TS-9832 | 4160 | 600 |
| 2 | 450 | Whse. | | 2300 | 1800 |
| 2 | 350 | G.E. | TS | 2200 | 150 |
| 1 | 320 | G.E. | ATI | 2300 | 600 |
| 1 | 300 | G.E. | ATI | 440 | 720 |

## BELYEA COMPANY, INC.

47 Howell Street, Jersey City 6, N. J.

# 230 VOLT D. C. VARIABLE SPEED MOTORS

3—150 H.P. Reliance Frame 1400 T, 230 Volt, D.C., Ball Bearing, 40°, Speed 400/1200 R.P.M.

*Immediate Shipment*

| H.P. | Make | Type | Speed |
|---|---|---|---|
| 100 | G.E. | CD-173 | 400/1200 |
| 75 | G.E. | D.Int. | 500/1500 |
| 75 | Cr.Wh. | Vert | 480/670 |
| 75 | Cr.Wh. | CMC-125H | 375/750 |
| 60 | G.E. | C.Int. | 480/1100 |
| 50 | West. | SK | 250/1000 |
| 50 | West. | SK | 500/1500 |
| 40 | G.E. | CDM-1441 | 250/1500 |
| 35 | West. | SK-160 | 400/1600 |
| 25 | G.E. | RF | 400/1600 |
| 25 | G.E. | RF | 300/1200 |
| 20 | G.E. | RF-12 | 400/1200 |

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*Established 1910*

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Link Belt 2½ yard crane
Browning 1¼ yard crane
Universal truck crane
B-G Model 522 bucket loader
Silent Hoist Krane Krawler
Power units, 2 to 100 H.P.

TRACTOR & EQUIPMENT CO.
3507 W. 51st St. Chicago, 32

# CHANDEYSSON GENERATOR SETS

2—MOTOR SYNCHRONOUS Type A 21.5, serial 30360, 30 hp., 440 v., 720 rpm., 60 cyc., 3 ph., open type. Temp. raise 25 degrees C. normal time rating cont., self ventilated.
GENERATOR, shunt, type NPT-13.25, serial 30359, 40 v., D.C., K.W. 20, 720 rpm., open type 500 amp.
GENERATOR EXCITOR compound, type X6.5, 32 v., D.C., Constant I KW. CONTROL PANEL complete.
1—SAME AS ABOVE, BUT 20 KW., 50 volt, 500 amp.

*All above Units in excellent condition*

*Price* $1250.00 each or $3500.00 for all fob Cincinnati, Ohio

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237 Mill St., Cincinnati 3, Ohio

1—Worthington — horizontal — water cooled — size 9½ x 10 — single stage — max. pressure 125 lbs./sq. in. 30 H.P. Western Electric induction motor, 2 phase, 60 cycle — 220 volt with starter — 6 V belt drive. Cubic ft. per min. — actual delivery, 200 lbs.

**The Toledo Desk & Fixture Co.**
Maumee, Ohio

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*Large & Small*

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187 Centre St., N. Y. C. M. Land, Prop.

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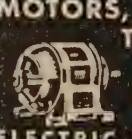

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New and Rebuilt

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## WELDING ROD STAINLESS

We can offer you approximately 200 tons of stainless welding rods from 1/8" dia. up to 1/2" dia. (all intermediate sizes)—in Type's 307—308—310—all of this rod is new and prime and comes packed in original factory cartons—all properly marked as to maker, size, grade and quality —"Send For Our Stock List"—We can save you money!

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Cadillac 8277

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## NEW STEEL STACK

5'-10" I.D. x 125 Ft., Self Supporting Welded. 3/8 Plate 35 Ft., 5/16 Plate 40 Ft., 1/4 Plate 50 Ft., With Ladder.

Immediate delivery from a fabricating shop in Chicago.

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*General Engineering Department*
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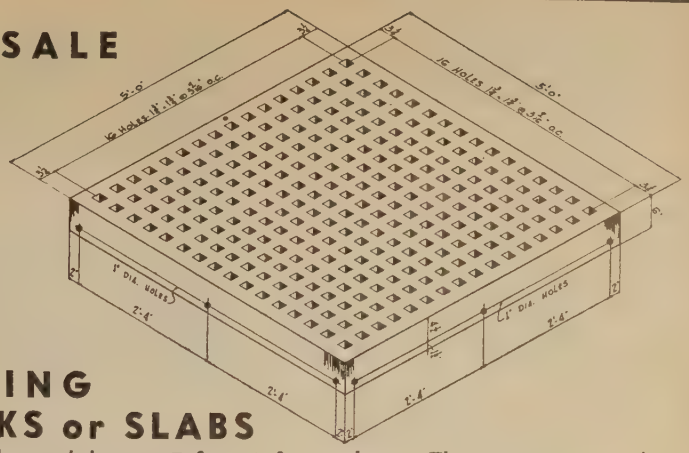


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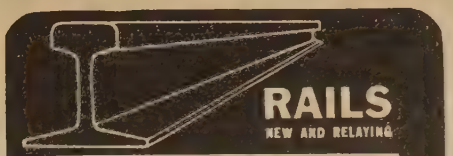

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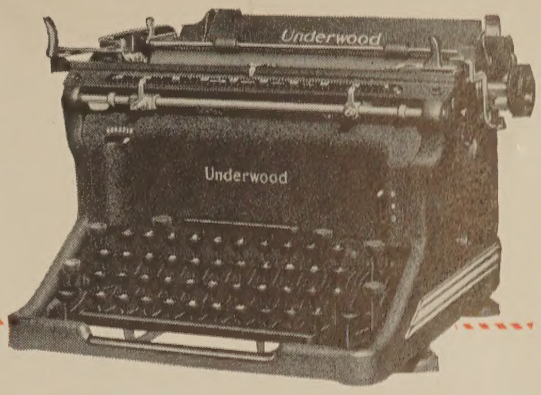
# Underwood tackles HIGH BREAK-EVEN POINT

The Underwood Corporation of Hartford, Conn. is completing a far-sighted program to eliminate production inefficiencies in the manufacture of their world famous typewriters and business machines. Obsolete equipment is being replaced by fully automatic machine tools.

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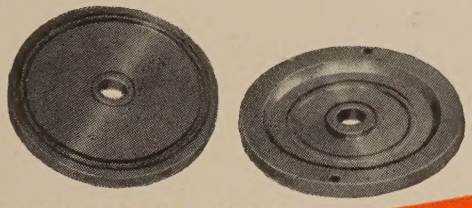
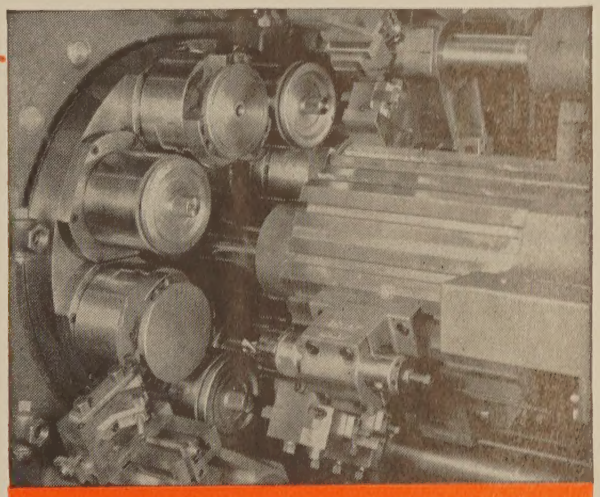


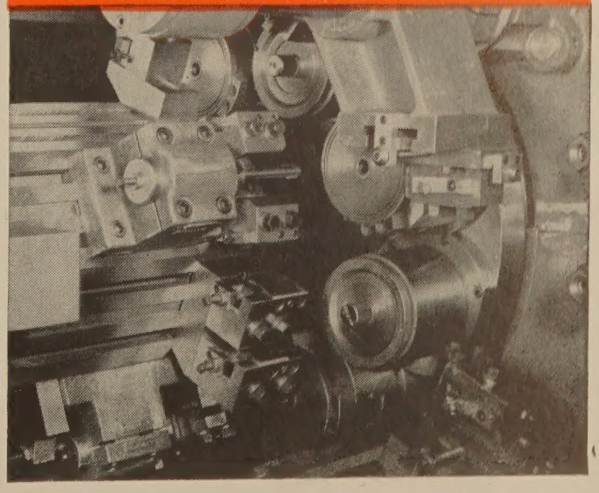
The production of the important type bar segment, illustrated, is an example of this sensible approach to profits. It was formerly machined by six operators on four turret lathes, two engine lathes and one special grooving machine. These seven machines and six operators were replaced by one New Britain Model 88 Automatic Chucking Machine.

## * RESULT

- Production increased from 90 to 120 pieces per hour
- Labor costs reduced 85%
- Quality of part greatly improved with tolerances held under 0.001"



The operations are finishing the O.D., facing both contoured sides, machining the I.D. of the hub, and trepanning wire grooves in one face. Simultaneous completion of both sides was made possible by arranging the machine for double index.



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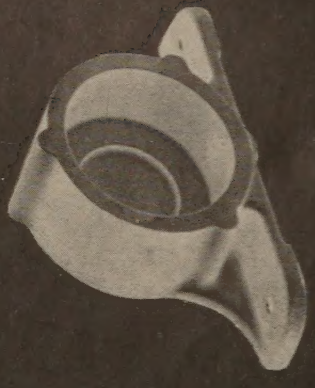
Malleable Castings

*Trade Mark*



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